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COST ESTIMATING IN SUPPORT OF CONTRACT NEGOTIATIONS

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BEFORE THE

SUBCOMMITTEE ON DEFENSE ACQUISITION POLICY

OF THE

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UNITED STATES SENATE

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COST ESTIMATING IN SUPPORT OF CONTRACT NEGOTIATIONS

WEDNESDAY, MARCH 20, 1985

U.S. SENATE,
COMMITTEE ON ARMED SERVICES,
SUBCOMMITTEE ON DEFENSE ACQUISITION POLICY,
Washington, DC.

The subcommittee met in open session, pursuant to notice, at 2:17 p.m. in room SR-253, Russell Senate Office Building, Senator Dan Quayle (chairman) presiding.

Present: Senators Quayle, Warner, Levin, Bingaman, Dixon, and Glenn.

Staff present: Alan L. Chvotkin, counsel; Jonathan L. Etherton, professional staff member; and Marie Chaillet, staff assistant.

Also present: Romie L. Brownlee, assistant to Senator Warner; John Rasmussen, assistant to Senator Gramm; Edward McGaffigan, Jr., assistant to Senator Bingaman; Charles C. Smith, assistant to Senator Dixon; Phillip P. Upschulte, assistant to Senator Glenn; Ralph White, assistant to Senator Levin; Dr. Bill Hunter and Bob Guttman, assistants to Senator Quayle; and Bill Budd, assistant to Senator Warner.

OPENING STATEMENT BY SENATOR DAN QUAYLE, CHAIRMAN

Senator QUAYLE. The subcommittee will come to order.

Today the Subcommittee on Defense Acquisition Policy will be receiving testimony on the subject of cost estimating in the Department of Defense. The focus of today's hearing will be on cost estimating tools needed to support the contracting officer in negotiations with the defense contractor.

During the course of our audit policy hearing this week, serious questions were raised about the incentives that defense contractors have to lower costs. In the private sector the pressure of competition naturally forces businesses to control costs and increase productivity. Despite the recent increases in the number of competitively awarded Department of Defense contracts, we are not yet close to creating a fully competitive procurement environment in the Department of Defense.

In an environment where a significant number of contracts are awarded noncompetitively, we must depend on the process of contract negotiation to limit the cost of weapons systems. In order for the contracting officer to successfully represent the interest of the American taxpayer, he must have an accurate analysis of the costs submitted in a contractor's proposal.

I intend to explore the details of this cost analysis and estimating process by reviewing the resources that the services and the Defense Contract Audit Agency devote to this critical area. Are we using sufficient manufacturing technology expertise in the cost estimating process? Are we using should-cost, design-to-cost, and independent cost estimating to a great enough extent, especially at the point of transition from full-scale engineering to initial production and earlier? How do resources we devote to cost estimating and analysis compare with those in the defense industry?

Before calling on the witnesses, I ask Senator Dixon if he has an opening statement.

Senator **Dixon**. Mr. Chairman, I ask leave that my statement be made part of the record.

Senator **Quayle**. Without objection, it will be made a part of the record.

[The prepared statement of Senator Dixon follows:]

Prepared Statement by Senator Alan J. Dixon

Mr. Chairman, today's hearing on the issue of cost estimating for weapons systems is one we reviewed in the last Congress before we passed the procurement competition statutes that were part of the fiscal 1985 Defense Authorization Bill.

During the discussion last year, we came to the conclusion that many weapons systems are awarded without competition, and, therefore, the contracting officer needs to have accurate cost estimates to help him or her during negotiations with the contractor.

There is also a second element in the cost estimating for weapon systems. Too many times in the past, the services would design a new weapon system without taking into consideration whether parts of the system could be broken out for competition leaving the contracting officer without authority to negotiate on anything but a sole source basis with the prime contractor.

This entire system of weapon design cost estimating and contract awarding must be changed if the taxpayers are to receive a quality product at a fair and competitive price.

Today's hearing will move us in that direction.

Thank you Mr. Chairman.

Senator **Quayle**. Our first witness is Maj. Gen. Jere W. Sharp.

STATEMENT OF MAJ. GEN. JERE W. SHARP, DIRECTOR OF CONTRACTING AND PRODUCTION, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS, DEPARTMENT OF THE ARMY, ACCOMPANIED BY JOHN JURY, CHIEF OF POLICY, ARMY MATERIEL COMMAND, DEPARTMENT OF THE ARMY

General **Sharp**. Thank you, Mr. Chairman.

It is a pleasure for me to be here today to participate in these hearings on this very important subject. I have brought along with me, and I would like to introduce him to you, Mr. John Jury, who is the Chief of Policy from the Army Materiel Command.

Senator **Quayle**. Very good. Welcome.

General **Sharp**. With your permission, sir, I would like my statement to be published in the record and I would like to give you just a short summary.

Senator **Quayle**. That would be greatly appreciated, General.

General **Sharp**. All right, sir. Over the past few years we have greatly increased our use of sophisticated estimating techniques, such as should-cost analyses, and improved our review process of the negotiating position of our contracting officers. We perform cost analyses of contractors' proposals on all weapons systems procurement where adequate competition does not exist.

In the performance of a cost analysis, the contracting officer relies to a great extent on the data that is furnished to him by the Defense Contract Audit Agency and the cognizant contract administration activity. When a more in-depth cost analysis is required, we perform a should-cost study.

These should-cost analyses are performed by experts from many disciplines, including industrial engineers and manufacturing technology engineers. Army policy requires a should-cost analysis on the first and fourth production buys on all major programs that are noncompetitive. The reason for conducting a review on the first production lot is at this point a contractor is making decisions on how he intends to produce the system. The second should-cost reviews the data, including the production process from the first production lot, to ensure that the item is being produced in the most efficient manner.

During 1984, we conducted the first should-cost review of overhead costs. This was done at Martin Marietta Corp. and resulted in an estimated $180 million cost avoidance to the Government over a 4-year period. During 1985, we will conduct a second one of these overhead should-cost estimates, at Hughes Helicopters.

On all noncompetitive Army Materiel Command procurements over a half million dollars, business clearance reviews are conducted at——

Senator DIXON. Do you mean—you said a half a million. Did you mean that?

General SHARP. Yes, sir, $500,000.

Senator DIXON. You have "$50 million" in your statement. I just wanted to clarify that.

General SHARP. I am sorry, sir. That is an error; $500,000.

Senator QUAYLE. We will make sure that is corrected.

General SHARP. Please correct that.

Business clearance reviews are conducted at the buying commands or at headquarters, Army Materiel Command, depending on the amount of the contract. The larger ones are done at the Army Materiel Command.

These business clearance reviews, conducted prior to the start of negotiations, cover the contracting officer's negotiation position and the rationale supporting that position. The result of the business clearance review is the establishment of the contracting officer's negotiation price objective, which cannot be exceeded without approval from the headquarters making the review.

Finally, sir, no discussion of cost control would be complete without recognition of what I think is the most powerful tool we have, and that is competition. We in the Army are convinced that our competition advocates are going to significantly contribute to cost control through their participation in the acquisition review process.

We really believe that the increased management vigilance and the in-depth cost analysis that we are doing are helping us to negotiate reasonable prices on the contracts that we have.

Thank you very much, Mr. Chairman.

[The prepared statement of General Sharp follows:]

PREPARED STATEMENT OF MAJ. GEN. JERE W. SHARP, U.S. ARMY

Good morning, I am Major General Sharp, Director of Contracting and Production in the Office of the Deputy Chief of Staff for Logistics. I am pleased to be here today to discuss with you the process used by contracting officers and their staff in developing contract negotiation positions for Army weapon systems.

Over the last few years, the Army has greatly increased its use of sophisticated estimating techniques, such as should cost analysis, and has improved its review process of the negotiation position of contracting officers. This increased management, vigilance and more in-depth cost analysis are helping us to negotiate the lowest reasonable prices for our weapon systems.

The Army performs a cost analysis on most contractor proposals of $500,000 or more. The only exceptions to the requirement to perform a cost analysis are when prices are based on adequate price competition, established catalog or market prices of commercial items, set by law or regulation, or in other cases when price reasonableness can be determined through the use of a price analysis. The depth of a cost analysis varies from program to program depending on the cost and maturity of the program and the complexity of the product. Cost analyses performed on programs early in development rely heavily on the actual costs incurred on similar type programs. As programs mature, the actual incurred costs on that program usually become the primary base from which the contractor and the Army project and negotiated future costs.

In the performance of a cost analysis, the contracting officer and his contract cost/price analyst rely heavily on the data furnished to them by the Defense Contract Audit Agency (DCAA) and the cognizant contract administration organization. The DCAA usually performs a detailed analysis regarding the reasonableness of the contractor's proposed material costs as well as an analysis of proposed labor and overhead rates. On large procurements, DCAA is usually requested to perform an audit of all major subcontractor proposals. The results of the subcontract audits are provided to the contracting officer and a report covering the major questions concerning price reasonableness is furnished to the prime contractor for use in negotiations with its subcontractors. The Army expects the prime contractor to analyze the labor hours and material proposed by subcontractors and to furnish the results of these reviews to the contracting officer. The primary reviews conducted by the contract administration organization deal with the types and quantities of proposed material items and the proposed manufacturing and engineering hours. On most procurements, these analyses form the bases for the contracting officer's negotiation position.

All of the above cost analysis techniques rely extensively on a contractor's past experience. Thus, if a contractor has been inefficient, the same inefficiencies tend to be projected into the future. A should cost review, on the other hand, not only reviews past history, but questions the contractor on the processes and methods it proposes to use to produce a product. The should cost analysis is performed by experts from many disciplines including industrial engineering and manufacturing technology engineering. This review is an in-depth analysis of all facets of the manufacturing process a should cost analysis provides the contracting officer with a negotiation position of what an item should cost if produced in an efficient manner.

As previously mentioned, the Army has expanded its use of should cost reviews. Current Army policy requires a should cost analysis on the first and fourth production buys on all major programs that are noncompetitive and have annual procurements of $500,000 or more. A should cost analysis can be performed on any other procurement, if it is considered necessary by the procuring activity.

The reason for performing a should cost analysis on the first production lot is at this point, a contractor is making decisions on how he intends to produce the system. The should cost team reviews the contractor's production planning and often recommends more efficient and cost effective ways of producing the product. The should cost analysis performed on the fourth production procurement is usually not as extensive as the first, but concentrates on those areas identified in the initial review as major cost drivers. On most weapon systems, the first production lot is complete prior to the start of the fourth production procurement. The should cost team reviews the data, including the processes used, from the first production lot to ensure that the item is being produced in the most efficient manner.

During 1984, the Army conducted the first should cost review of overhead costs. This review was conducted at the Orlando, Florida facilities of the Martin Marietta Corporation and resulted in approximately $180 million in cost avoidance to the Government. During 1985, the Army will conduct another should cost review of overhead expenses. This review will take place at Hughes Helicopters, Inc.

On all noncompetitive procurements over $500,000 the Army requires a business clearance review. The business clearance review is conducted prior to the start of negotiations. It is a review of the contracting officer's negotiation position and the rationale supporting said position. The result of the business clearance review is the establishment of a not-to-exceed Army negotiation price objective. If during the course of negotiations, the contracting officer becomes convinced that the ceiling objective is too low, he must go back to the business clearance board to seek relief. On all noncompetitive Army Materiel Command procurements over $500,000, business clearance reviews are conducted at the Headquarters level.

Independent cost estimates are performed on all major Army weapon system procurements. These are usually parametric estimates which rely heavily on data from various contractors on previously built, similar systems. Since these estimates do not break costs down by cost element, that is, overhead, material and labor, but are based on data from a number of companies using different accounting systems, they are of little help during the negotiation phase. However, they serve a useful purpose as a general benchmark against which the overall reasonablcs of a negotiated price can be measured. Current Army Materiel Command policy requires a contracting officer to explain major differences between the negotiated price and the independent cost estimate.

Estimates provided to the contracting officer are usually conservative. DCAA and other reviews question costs that are not fully supported. During negotiations the contractor may be able to support some of the questioned costs. Negotiated prices and actual costs incurred are usually slightly higher than the estimate. However, negotiated prices and incurred costs tend to be very close, especially in later production procurements.

During early production and the development phases of a program, the Army has at times found it difficult to estimate and negotiate prices that accurately predict the final cost outcome of a contract. The cost of a high technology system, especially one at the edge of the state-of-the-art, is difficult for contractors and government personnel to estimate. Unanticipated programs in design or in the contractor's ability to produce the item in other than a laboratory environment may occur. All proposals are to include some factor for unknown potential problems. However, when this factor is underestimated, cost overruns occur. The Army is attempting to take some of the risks out of the producibility area by requiring contractors to address this subject in the initial development contract proposal. As part of future development programs, contracts will require contractors to develop production plans, through a Production Engineering effort, at the same time as the item is being designed.

While reviewing proposals for development and early production, Government analysts are instructed to not only look for areas that are overpriced, but also areas that are underpriced. However, while it appears that many Government analysts are very good at finding areas that are overpriced, only a few ever detect underestimating. Perhaps this is the result of our training system that places great emphasis on teaching techniques to discover overpricing. I intend to have the Army Procurement Research Office look into this area. Certainly when costs are underestimated and overruns occur, neither the contractor nor the Government wins. The contractor receives less profit on the specific contract and often his other programs are disrupted. The government ends up paying higher prices than planned for an item and frequently has to reduce its requirements. Clearly, industry and Government must do a better job in estimating development and early production costs of weapons systems.

Finally, no discussion of cost control would be complete without recognition of the most powerful tool in the Government's box—competition. The Army fully supports the aims of the Competition in Contracting Act of 1984, and is convinced that its Competition Advocates will significantly contribute to cost control through their participation in the acquisition review process. We see competition as a "win-win" proposition, with the Army getting quality equipment on time at a good price, and our contractors being fairly compensated for their labors. To us, all of the techniques I've mentioned with competition in the forefront, are effective means of controlling weapon systems costs.

Senator QUAYLE. All right. Thank you very much. General. Admiral Sansone?

STATEMENT OF REAR ADM. JOSEPH S. SANSONE, JR., SUPPLY CORPS, U.S. NAVY, DEPUTY CHIEF FOR CONTRACTS AND BUSINESS MANAGEMENT, NAVAL MATERIAL COMMAND

Admiral SANSONE. Thank you, Mr. Chairman.

With your indulgence, sir, I would like to stress a couple of points in my statement, and I would ask that my statement be submitted for the record.

Senator QUAYLE. It will be included. Please proceed.

Admiral SANSONE. Our contract cost analysis function is one of the things we think in the Navy is the most important function that we perform. It supports the Navy's judgment that the contractor can produce the product we need, when we need it, and at the price negotiated.

The range of these analyses begins with understanding the contractor's technical and management approach, and extends to the details the contractor employs to derive his price proposal. The contractor is required to furnish with his proposal direct and indirect cost data that permits detailed analyses to ensure cost realism. The cost data is analyzed by various Government specialists, including DCAA and Navy technical and pricing personnel.

The Navy also utilizes manufacturing production engineering expertise to evaluate what the contractor proposes from a production standpoint to see if that makes sense, both qualitatively and quantitatively, and agrees with the cost proposal.

These independent reports are furnished to the contracting officer for consideration in establishing his negotiation objectives. Although the contracting officer relies heavily on the findings and recommendations of these experts, the contracting officer is required to make independent judgments and determine the Navy's objectives for negotiation.

Within the past couple of years, the Navy has conducted a number of should-cost studies of some of our largest programs. We believe that a should-cost study is an additional tool to assist the contracting officer in making an independent judgment. The results of should-cost studies are used by the contracting officer in establishing his negotiation objectives.

Should-cost studies are particularly valuable in situations where the forces of competition in the free marketplace are not present. Irrespective of whether a should cost study is performed, in either competitive or single source negotiations, all current and historical cost data is evaluated and documented in the contracting officer's business clearance.

A brief word on the business clearance. It is a self-supporting document that contains all of the cost elements and supporting data, as well as terms and conditions that will lead to a definitized contract. The approval authority for business clearances varies depending on the activity and the value of the procurement. While some authority may rest in the contracting organization itself, the approval responsibility for weapons systems procurement rests with the Chief of Naval Material and, more precisely, Mr. Chairman, with me.

The description that I have given here summarizes very briefly the Navy process and addresses the tools and techniques used to arrive at a contract price. Each major system acquisition is different and we employ different tools. But the main thing I want to stress is that we use a team, a team consisting of experts, and by using this team and the data the team analyzes, the contracting officer can negotiate a contract price that we can approve as being fair and reasonable for the taxpayer.

I would be pleased to answer any questions you may have, Mr. Chairman.

[The prepared statement of Admiral Sansone follows:]

PREPARED STATEMENT OF REAR ADM. JOSEPH S. SANSONE, SUPPLY CORPS, U.S. NAVY, DEPUTY CHIEF OF NAVAL MATERIAL FOR CONTRACTS AND BUSINESS MANAGEMENT

TECHNIQUES AND TOOLS FOR CONTRACT PRICING

My testimony today will address the process by which we arrive at a negotiated, agreed upon contract price for a weapon system in the Navy; the relationship between current prices and previously developed cost estimates, and the availability of cost estimates and cost analyses information to the contracting officer.

From the contracting officer's standpoint, the process of awarding a weapon system contract begins with the approval of a program in the budget process. Prior to program approval in the budget, a significant amount of effort has already been invested in estimating the overall program cost, developing that program cost into a budget request, justifying and supporting that budget request through the Navy and OSD, and receiving approval of the budget request in an authorization and appropriation from the Congress. It is important to note that the cost estimates that were used in developing the total program budget have throughout this process been subjected to intense scrutiny at all levels including the project office in the Hardware Systems Command, the Navy budget process, the OSD and OMB, and ultimately by the Congress.

The next step is the receipt of a complete and approved procurement request (PR) in the contracting organization which commences the execution phase of the planning, programming and budgeting cycle. The PR is generated by the requiring activity or program manager and provides not only the description and specification for the system to be bought but also the funding necessary to buy that system. By the time a program is committed to a procurement request the program has been reviewed at various echelons. All of these reviews have been aimed at independently challenging and fine tuning the acquisition strategy and the program cost estimates which have typically taken into account the following considerations: system definition, number of units, acquisition schedule, economic environment, technology state of the art, test and development philosophy, reliability and maintainability philosophy, logistics philosophy, producibility, the available industrial base, the financial condition and efficiency of that base, the contracting and business strategy and any other tailored considerations peculiar to the program that might affect program and system cost. All of this information including the detailed mechanics of how the estimates and projections were developed is documented by the contracting officer and program manager in the acquisition plan, which is also reviewed and approved at levels above the program manager and the contracting officer.

Receipt of the procurement request is followed by preparation of a solicitation to industry, either a request for proposal (RFP) or an invitation for bid (IFB) depending on whether the item to be purchased requires negotiation or can be advertised for sealed bids. In weapons system buys we're usually in a situation that demands negotiations. However, the use of negotiations does not, and I stress not, mean there is no competition. Increasingly, the Navy's negotiated procurements are competitive. The release of the solicitation to industry is the culmination of an intensive process of review and approval that integrates inputs from technical, program management, business, logistics, legal and contracting personnel, all of which are documented in the very detailed acquisition plan that is reviewed at high levels and addresses the full range of business and program considerations. Upon receipt of industry proposals in response to the solicitation, the process of evaluation and source selection begins. It is during this phase that the Navy requires preparation of a pre-negotiation business clearance which identifies the Navy's negotiation objectives. These negotiation objectives must include, at a minimum, objectives for cost, profit, terms and conditions, schedule and other major business or technical elements that will be discussed with the offerors. The clearance document will be based upon:

Contractor's cost proposal;

Navy or other technical and engineering advisory evaluation of the proposal (NAVPRO/DCAS/SUPSHIPS/AFPRO);

DCAA advisory audit reports on the contractor's proposals;

Independent cost estimates including any should cost estimates or studies;

Analysis of all of the above data by Navy experts on the evaluation team.

Contract cost analysis is part of this evaluation to support the Navy's judgment that the contractor can produce the product we need, when we need it, and at the price negotiated. The range of such analysis begins with understanding the contractor's technical and management approach and extends to the details the contractor employed to derive the price proposal. In support thereof, the contractor is required to furnish with the proposal direct and indirect cost data that permits detailed analyses to ensure cost realism. The cost data is analyzed by various government specialists including DCAA and Navy technical and pricing personnel. The Navy also utilizes manufacturing and production engineering expertise to evaluate what the contractor proposes from a production standpoint to see if that makes sense both qualitatively and quantitatively with the cost proposal. These independent reports are furnished to the contracting officer for consideration in establishing the negotiation objectives. Although the contracting officer relies heavily on the findings and recommendations of these experts, the contracting officer is required to make independent judgments and determine the Navy's objectives and negotiations.

Within the past few weeks, the Navy has conducted a number of should cost studies on some of our largest programs.

The results of should cost studies are used by the contracting officer in establishing the negotiation objectives. Should cost studies are particularly valuable in situations where the forces of competition in the free market place are not present. In either competitive or single source negotiations all current and historical cost data are evaluated and documented in the contracting officer's pre-negotiation business clearance.

The business clearance therefore becomes a self-supporting document containing all of the cost elements and supporting data and terms and conditions that will lead to a definitized contract. It is reviewed for negotiation authority; conformance with the procurement plan; consideration of field recommendations; accuracy and propriety of structured learning curves; labor rates; overheads and G&A; effective competition in subcontracting; unit price trends, should cost analyses, actual costs on prior buys; historical and current cost trends and regression and correlation analyses of manufacturing, engineering and tooling manhours and a detailed analyses on profit or fee based on type of contract and whether the effort is R&D, manufacturing or services. The approval authority for business clearances varies depending on the activity and the value of the procurement. While some authority may rest in the contracting organization itself, the approval responsibility for the weapon systems procurements we are discussing here rests with the Chief of Naval material. Once the pre-negotiation clearance is approved, negotiations begin. After agreements are reached, a post-negotiation clearance is developed and submitted for approval. The post-negotiation clearance supports and justifies deviations or any departures from the pre-negotiation clearance approvals. The post clearance approval leads directly to contract award.

What I've described above summarizes very briefly the Navy process, tools and techniques used to arrive at a contract price. Obviously, each major system procurement will differ somewhat from the model I've described here. These are the basics and are followed whether contracting for a major system in full production or a level of effort in a development program. However, no matter how good we are in negotiations, the most significant single effect on the ultimate cost is competition, and as I stated earlier Navy is making major progress to ensure more and more of our procurements are competitive.

Senator QUAYLE. Thank you, Admiral.

General Weiss.

STATEMENT OF MAJ. GEN. BERNARD L. WEISS, U.S. AIR FORCE, DIRECTOR OF CONTRACTING AND MANUFACTURING POLICY, OFFICE OF THE DEPUTY CHIEF OF STAFF, RESEARCH, DEVELOPMENT, AND ACQUISITION, DEPARTMENT OF THE AIR FORCE

General WEISS. Mr. Chairman, I am the Director of Contracting and Manufacturing Policy within the Deputy Chief of Staff for Research, Development, and Acquisition at Headquarters, USAF.

I, too, welcome the opportunity to appear before you once again and share the views of the Air Force with regard to the pricing and negotiation of Government contracts. This task is difficult and very complex. My comments are going to be oriented more toward the major weapons systems type of contracts, but there is parallelism in other forms of contracting for logistics and other kinds of goods and services.

I would like to set the framework of how you price and negotiate these kinds of contracts. The nature of the task really depends upon the complexity of the product or the services you are going to buy, the dollar values involved, the technical and cost risks involved, and the period of performance, whether the performance period is a year or the period of performance can run to 6 or 7 years or somewhere in between, and whether in fact there is competition or it is other than free and open competition under the new Competition in Contracting Act.

Even where there is competition, we find that we do review the contractor's proposal to ensure that the prices proposed are fair and reasonable. Particularly where there is no competition, we do get into the indepth cost analysis using many, many different tools and techniques and checks and balances to ensure that the taxpayer gets a fair shake in terms of what the cost of the hardware or services are.

We too have a multidiscipline team, made up of many different people—contracting, pricing, industrial specialists, industrial engineers, manufacturing technology people, engineering people—which are led by an Air Force contracting officer who attempts to put together an Air Force negotiation objective.

The basis for negotiating within the Government is Public Law 87-653, and it requires the contractor to certify that his proposal is accurate, current, and complete. This threshold, as you are aware, goes down from $500,000 to $100,000 in April of this year. It sets the basis for negotiations.

We use the extensive review of the Defense Contract Audit Agency. In many cases the auditor participates in negotiations and participates in the setting of prenegotiation objectives. We are very much interested in expanding the role of the defense contract auditor in the negotiation process to be aware of what is going on and see the results of some of his inputs.

We get inputs from the contract administration component, which is the AFPRO or NAVPRO or the Defense Contract Administrative Service area of DLA. We bring together a team that will cause factfinding during the receipt of the proposal and accomplish analyses.

There are many checks and balances in the total process. Any discussion of negotiation and pricing of Government contracts has to include the discussion of contract type. Early in the acquisition stage, we hold what we refer to as a business strategy panel and we lay out a strategy for the acquisition of the product, the research and development, the goods and/or the services.

In that particular strategy session, we look at contract type. Contract type and pricing go hand in hand. You must tailor your contract type to the risk that is involved in the product or services you are acquiring. In addition, your ability or inability to come to closure on a fair and equitable price could determine whether you would use a fixed price type contract or another form of contract.

Generally, on low risk types of contracts in the area of technical, and cost risk, we use firm fixed price contracts. Where we have high risk in the technical or the cost area, we move to cost type contracts. In between both of these extremes are the areas of fixed price incentive and cost-plus incentive fee contracts.

Not only is the contract type important in the process of pricing and negotiating, but also is the use of special terms and conditions or clauses, such as a clause dealing with economic price adjustment due to increases or decreases in inflation over a long period of performance such as 6 or 7 years.

The team, using the indepth analysis, the inputs of the various specialists and the DCAA, then concentrates on three major elements of costs. The first major element of cost is direct labor. Based upon experience of the Air Force Contract Management Division, we find that on the average, weapons system direct labor amounts to about 20 percent of the total cost under that contract.

Here we are looking at two things. We are looking at the actual rates we pay for hourly employees, salaried employees, exempt employees, to try to ensure that they are the going rates and that the compensation is fair and reasonable. We tend to do this on what we call a forward pricing rate agreement basis on an annual basis, and it is usually ready at the time we move into a major negotiation.

The other thing we are looking at in the direct labor area is the skill mix. Are we getting the right mix of people? If the job is not complex, we should not have all Ph.D.'s or highly skilled hourly workers. If in fact the job is complex, we need the proper skill mix to match the technical nature of the work.

The other important thing in looking at direct labor is the multiplier: How many hours does it take these people to do engineering tasks or to do manufacturing tasks or to do inspection tasks. So we need people who are expert, and we bring these people in to estimate the amount of hours that the task will take. We put that together and develop an objective that we build upon as we go through the other two elements of cost.

The next element of cost is indirect. Sometimes people refer to it as overhead, but it is those costs that cannot be charged direct to a contract because the nature of expenses support all the business in that contractor's company or in that contractor's facility.

Indirect costs amount to, in our experience, about 30 percent of the total costs under a particular contractor proposal. It is very important that you look at indirect costs and ensure that they are allocable to the nature of the work and that you estimate them in a very careful manner. Depreciation is an indirect cost; insurance coverage and all fringe benefits are indirect costs. The allocation of some executive personnel are indirect costs.

And even though you may do that well, you must be careful that there are not changes in the business base, because indirect costs are allocated based upon business base. If in fact the company has $100 million worth of business and in the period of performance of that contract his business base increases 100 percent, he in fact can make additional profits because the base expanded twice the size and he can then allocate his overhead to a bigger business base and his overhead theoretically would go down.

So it is important that you look at the nature of the charges, but also the business base. And when you write a contract for 7 or 8 years, we are not sure what the business base will be in the future, so it is a very important consideration.

The last element of cost is subcontract and material costs, and that amounts in today's environment to 50 percent, 50 percent of the total cost proposal of a company. Now, these are estimates so there is a range, but I am using a single number here to make the point.

If you look at a major weapons system contract, there are over 3,000 subcontracts and major purchases that that prime contractor would make. And here again, we use the support of the DCAA, our engineering staff, our logistics specialists, to ensure that this element of cost is properly validated and allocated to this particular program.

We do not want to get involved in subcontract management, but we do have requirements to have the Defense Contract Audit Agency analyze some of these major subcontracts to validate their numbers. We use DCAA to provide audit. We use Air Force price analysis people to also assist in evaluating subcontracts and purchases.

While we are doing all of these three elements of cost—direct, indirect, and subcontracts and material purchases—we have many special reviews that go on: contractor estimating systems that are looking at how a contractor buys his things; a contractor's employee compensation system, to make sure that the wages and salaries and fringes are realistic and what should be paid.

Make or buy; does he make something in-house or does he buy it from a vendor? Sometimes it is cheaper to buy it from a vendor and not make it in-house, and we are concerned with getting that benefit. How he uses ADPE, lease versus buying equipment, overhead reviews, and also what has already been discussed as the should-cost reviews.

We use independent cost estimates done by our comptroller people as a check and balance to ensure that we are in fact developing the right objective for costs and price in the contract. Independent cost estimates are not so much related to individual contracts as they are related to total program, but they can be tailored to work back to segments of programs or individual contracts.

The check and balance is throughout the system. Instead of using the term "business clearance," we use "prenegotiation briefings." And based upon various dollar thresholds, different people within the functional and command channels review the range or the objective that a contracting officer has to negotiate a given contract. It is briefed at various levels.

Not only do we look at the issue of the price or the cost; we look at the issue of terms and conditions. We have a two-pronged system. Before you start negotiations, we look to assure that the objective is realistic and what we want in terms of a corporate commitment.

And No. 2, after the negotiation process is complete, we have a process that we call manual review. Here we have somebody look at the results of the negotiation process as documented in a thing we call "a price negotiation memorandum." That contract is not in fact an enforceable contract until after the manual review process is accomplished. So we have an opportunity to go back and, if necessary—and we do not like to do it—reopen negotiations.

Mr. Chairman, I think the system is sound, but, like any other system, it always needs improvements. And we and our colleagues in the other Services and the Department of Defense are working on some of those improvements. The ones that we in the Air Force are mostly concerned with at this point are enhancing the use of work measurement, the use of standard times and getting contractors to propose using Mil. Standard 1567A procedures.

We are very much concerned on doing should-costs on indirect work, on total factory operations: Are the overheads within a company truly essential for the business base within that company? Very much like what was done by the Army in the case that General Sharp mentioned.

We find that the area of subcontract pricing is the greatest share of the total proposed price to us, and we feel we have to look more at subcontract pricing and material purchasing.

The last area that we really want to emphasize is the area of compensation system costs. We are still working on strengthening the cost principle related to compensation system costs. There is a FAR case that is being worked. If you remember, I think I testified once before, we want to look at the elements of cost for reasonableness.

We want to put the burden of proof on the contractor and not keep it on the Government, and we want to use prevailing wage rates in local areas for selected skill levels.

These are the improvements that we are working on, and I will be happy to answer any of your questions.

[The prepared statement of General Weiss follows:]

PREPARED STATEMENT BY MAJ. GEN. BERNARD L. WEISS, DIRECTOR, CONTRACTING AND MANUFACTURING POLICY, HEADQUARTERS, U.S. AIR FORCE

Mr. Chairman, members of the committee: I appreciate this opportunity to discuss the pricing and negotiation of Air Force contracts. I am the Director of Contracting and Manufacturing Policy for the Deputy Chief of Staff for Research, Development and Acquisition. I have spent over 26 years of my Air Force career in contracting and manufacturing. I have served in all aspects of this business. This long experience has taught me a healthy respect for the difficulties and complexities of contract pricing and negotiation. I welcome this opportunity to share my views of this difficult and complex business with you.

Let me begin my remarks by stating that the nature of contract price negotiation depends on the nature of the item being acquired. If we are buying items for which we can conduct open competition, then we can depend on market forces to ensure reasonable prices. This does not mean that we rely totally on competition. We still take a hard look at proposed costs. However, the very nature of the competitive market place mitigates in favor of reasonable prices.

A noncompetitive situation is different. In this case we must rely on: contractor certification under P.L. 87-653 (Truth In Negotiation Act) that his proposal is current, accurate, and complete; the extensive review of the Defense Contract Audit Agency; the quality of our own fact finding and analysis; and, extensive negotiation to insure reasonable prices. Our ability to do this is heavily influenced by the risk associated with acquiring the product and/or services in question. Therefore, we select and tailor different contract types depending upon the perceived risks associated with performance under the contract and the contracting parties' ability to agree on an equitable price. If the risk is low, we use firm fixed price contracts. If the risk is high we use firm fixed price contracts. If the risk is high we use cost type contracts. In between these extremes, various forms of incentive contracts, to include differing share ratio's and ceilings, and provisions like economic price adjustment clauses, can be used to offset varying degrees of risk and uncertainty about the future.

The actual analysis, determination and negotiation of contract price(s) is a team effort. The Contracting Officer is the team chief. The team members include a group of experts, each of which is able to focus on particular elements of contract cost and what the future holds in store. These team members include the price analysts, the contract administrators, the Defense Contract Audit Agency, and various functional experts in such areas as engineering, logistics, manufacturing, employee compensation, and ADPE to name a few. The members of the team usually are responsible for specific elements of cost. The three major elements of cost are direct labor, indirect (or overhead), and subcontracts/raw material. Generally, direct labor accounts for 20% of total contract cost with indirect costs accounting for 30% and subcontracts/raw material accounting for the remaining 50%.

The analysis of direct labor costs, to include both engineering and manufacturing effort, begins well in advance of the actual contract negotiation. The labor rates to be used in pricing the contract are usually negotiated by the contract administration office with the assistance of the Defense Contract Audit Agency. These labor rate negotiations involve analysis of contractor and national wage/salary trends, forecasts of cost of living adjustments, and seniority trends within individual contractor wage categories.

The analysis of direct engineering and manufacturing hours is the responsibility of experts within both the program office and the CAO. These experts use engineering analysis, learning curve theory, and computerized estimates. We also ensure that the most efficient use is made of machine tools and methods. In addition, we review engineering and manufacturing workforce skills for efficiency.

The analysis of indirect cost is primarily the responsibility of the contract administration office and DCAA. In our Air Force Plant Representative Offices, we have teams whose major job is to look at indirect costs. The salaries and wages of indirect personnel along with fringe benefits and payroll taxes, of both direct and indirect personnel, typically account for the majority of contractor indirect costs. The Air Force team must look at the factors that influence indirect salaries and wages. In addition, they must analyze the many complex factors that determine the cost of employee paid absences, retirement plans, group insurance (including medical) costs, and savings plan costs. Our negotiators must be able to forecast trends in payroll taxes like social security. After analyzing personnel related costs, we must look at all the other elements of indirect cost including depreciation, utilities, computer costs, communication costs, travel, and a myriad of other costs.

One final consideration of critical importance in dealing with indirect costs is determining how much cost to allocate to each contract. Indirect costs are projected on a plant-wide basis. They are then allocated to all contracts based on the amount of direct effort on each contract. Doing this requires that we be able to forecast a contractor's business base accurately. Failure to do this can result in significant overestimates, or underestimates, of contract cost even if we estimate all the expenses accurately.

The third and last element is subcontract/raw material costs. On a major system contract as many as 3000 different subcontract or major material purchases may be involved. The prime contractor has primary responsibility for obtaining valid subcontract and material prices. The Government's role is that of an overseer, facilitator, and auditor.

In the role of overseer, we require the contractor to establish a purchasing system which maximizes the use of competitive acquisition and aggressively negotiates reasonable prices where competition is not possible. We use Air Force price analysts and Defense Contract Audit Agency personnel to review major subcontracts and material purchases and validate their reasonableness so that we can finalize prime contract prices. We also require prime contractors to provide us with analyses of subcontractor proposals prior to prime contract negotiations.

In our role as facilitator, we assist the prime contractors' pricing effort by providing, through our contract administration and DCAA offices, analysis of subcontractor proposals which the prime contractor might not otherwise be able to obtain. In our role as auditor we continually review the contractor's subcontract pricing efforts and sample the accuracy of the prime contractor's subcontract pricing. In addition, we annually review the adequacy of the subcontractor's purchasing system.

There are a number of special reviews which assist and support contract negotiations. Contractor estimating system, employee compensation, ADPE, make or buy and cost monitorship reviews all have a significant impact on contract negotiations. Should Cost reviews are accomplished on contractor operations to ensure that the contractor is using the most efficient methods to produce the products required. The skills of manufacturing specialists, industrial engineers and work measurement analysts are particularly important in Should Cost reviews. We are using an increasing number of Should Cost studies in order to put maximum emphasis on lowering the cost of major systems contracts.

One other type of analysis that is extremely helpful in determining the efficacy of our negotiation objective and settlement is the Independent Cost Analysis, or ICA which is performed by comptroller personnel. This estimate is a useful check and balance for the negotiating team's efforts and can be valuable in negotiation.

After a review of all aspects of cost, the team establishes a profit objective for the proposed effort. Our profit objective is developed using a systematic analysis technique commonly called "Weighted Guidelines." This technique allows an integrated assessment of all aspects of the contracting situation. Profit goals selected depend upon the difficulty of the task itself, the employee skill levels required to perform the contract effort, the amount of cost risk the contractor is willing to accept and the extent of private investment in facilities and equipment. Once all the various reviews, studies, and prior negotiations are completed; the contracting officer must bring all of this information together to develop a negotiation objective. This negotiation objective is then briefed to senior contracting, program management, and Command officials. As a result of the prenegotiation briefing, the team is authorized to negotiate within approved ranges.

The Government relies on the skills of the negotiating team to obtain a reasonable price within the approved range. Once an agreement is reached on price, contract type, and terms and conditions, such as a Economic Price Adjustment provision, a formal contract document is prepared and signed by the contractor and contracting officer. This document, along with a description of how the price was negotiated, is then submitted to senior management, based upon the value of the contract, for final review and approval.

While the estimating, pricing, and negotiating processes are sound, we are still seeking improvements. These initiatives include increased emphasis on work measurement in analyzing manufacturing direct cost, renewed emphasis on indirect cost reduction, and more involvement in subcontract pricing.

This is the extent of my prepared remarks. I understand you have some questions which I will be glad to answer.

Senator QUAYLE. Thank you, General.

Mr. Newton.

STATEMENT OF FRED NEWTON, DEPUTY DIRECTOR, DEFENSE CONTRACT AUDIT AGENCY

Mr. NEWTON. Mr. Chairman, I appreciate having the opportunity to appear before you and describe the way that the DCAA audits contractor cost estimates.

We review and report on over 28,000 contract pricing proposals each year. They totaled over $272 billion last year. During that year negotiations using our audit recommendations resulted in savings of nearly $7 billion.

At this point, with your permission, I would like to submit my entire statement for the record and go to the exhibit which is attached to my statement.

Senator QUAYLE. OK, that would be fine. We will put your statement into the record.

Mr. NEWTON. This exhibit illustrates the major points which are brought out in the narrative. I think it is perhaps a bit easier to understand the audit process by seeing some numbers associated with it.

After receipt of a request from a contracting officer, the auditor begins his plan for the audit, including consideration of the total audit environment. This means he considers the accounting system surveys, estimating system surveys in prior audits of both costs incurred and pricing proposals.

He does not work in a vacuum. He develops a vulnerability and risk assessment of the instant proposal that he is to review. In this situation, he particularly gives consideration to things like the type of contract. In other words, the scope of audit would be more extensive if it is going to result in a firm, fixed price proposal as opposed to a cost-reimbursement contract.

He also considers experience with the contractor. Has the contractor had a fairly good track record on estimating costs? If not, then the extent of tests will be increased.

He would also consider whether we are dealing with a new item or revisions to a product, and again this would have a bearing upon the extent of the scope.

We have presented here the proposal and the results of the audit review in a similar fashion as one would see in a typical audit report on a pricing proposal. The first thing that I would point out, we associate with the results of the audit review any generalized qualifications or comments that are pertinent to the negotiator's consideration when looking at the proposal as a whole.

In this example we see a qualification about the impact of a deficiency in the contractor's accounting system regarding travel cost allocation. The contractor had charged all travel costs indirect in accordance with its system. The auditor has recommended that accounting procedures require direct charging of those travel costs specifically required for contract performance and has pointed out here that there is an estimate of the impact associated with labor overhead.

But since it is of a nature that the auditor would not be able to tell other places where there should be direct charging of indirect travel, the entire proposal is qualified in that regard.

This note also explains that the results of audit have incorporated the findings of a technical review performed by an engineer from the Defense Contract Administration Service Office. This is an extremely important feature toward achieving a thorough review of a cost estimate: a team action that involves both the auditors and Government technical specialists from the contracting activity.

Taking the elements of the proposal and going down, the first one is material; $500,000 is proposed in this instance. This $500,000 includes two proposed subcontracts. The first for $100,000 is a matter requiring an assist audit. That amount has been set out as an unresolved cost in the audit report pending receipt of the additional audit effort from another office.

Also there is a proposed contract for $20,000. In this case the amount is unsupported. The contract in this example is for a defrost element not required in prior versions of the proposed system. The contractor has not yet developed the configuration requirements or selected a subcontract.

The Government engineer advises that insufficient information is available for a reasonable estimate. The auditor recommends that the defrost element be the subject of a separate review and negotiation deferred until after information is available.

I would point out here that where unsupported costs are significant related to the total proposal or they are not separable for follow-on review, the auditor would issue what we term an "adverse opinion." This would be a flatout statement that the auditor recommends that this proposal not be used as a basis for a negotiation of a contract price.

There are several items in the material. We have a bill on material of $380,000 for the remainder of the material. In this case we have a couple of points illustrated.

The technical review has come up with an unnecessary gold plating of a part and the related $5,000 is questioned. The auditor has examined the historical cost in doing a routine test, which is a comparison of quotations which are used to support this proposal, going back and seeing what the experience has been. In this instance, the auditor has found that the contractor's experience is that where they get a quotation, through hard negotiation later on they are able to achieve a reduced price for the actual amount that is going to be paid to the vendor. The auditor has determined that those experienced reductions have averaged 10 percent of the quoted prices, and has questioned that ratio. It comes up to $37,500.

I would point out that where this condition occurs, the contract is flagged when it is awarded for special consideration for defective pricing. A very typical problem that occurs when the contractor is not reflecting those negotiated prices that they expect to realize is that there may be information available to the contractor, not available to the Government negotiator, which of course could result in defective pricing.

Moving to the material overhead, the contractor has proposed a rate of 20 percent of the direct material cost for their contract fiscal year 1986. We have an illustration here of 1 year of calculation of material overhead. I would point out, though, that in a typical price proposal it is common to have more than 1 year of performance involved, and when that is the case one must analyze each one of those years separately in the audit of proposed overhead costs.

The auditor here has reviewed the estimates of total direct material by comparing them with contractor budgets, Government Acquisition Office data, and historical costs. The overhead pool elements were compared with historical costs, supporting documents, and results of related DCAA audits.

Last year, in this instance, DCAA performed an operations audit of the contractor's material handling and control system. This, in particular, illustrates the effectiveness of our having operations audits at contractor locations. The findings here resulted in recommending some changes which would increase the efficiency and reduce indirect labor requirements by $2 million in the fiscal year 1986.

Since the contractor had not acted on the recommendation, the amount of savings available was questioned, along with the related fringe benefits and taxes. That results in a questioned amount in the pool of $2,700,000, and the result is a reduction of the rate. The rate was proposed at 20 percent and the recommended rate is 17.8 percent.

The proposed overhead allocable to questioned material costs, the total of which was $43,000, is also questioned. In addition, the difference between the rates, the proposed rate of 20 percent and the recommended rate of 18.7, is applied to the remainder of the proposed cost, for an additional questioned cost of $6,000.

For convenience of presentation in our audit reports, we do not show the overhead allocable to unsupported and unresolved costs, but rather we include a comment that the recommended rate should be applied to any of those amounts which become eliminated during the course of negotiations.

The contractor here has proposed direct labor of $100,000. That proposal is based on a breakdown schedule, which was examined by both the auditor and the Government engineer, and the auditor also made comparisons with historical cost records to develop information which might be useful for improvement curve analysis.

In this case, the auditor has observed that the labor hours have been reduced significantly because of recent acquisition of computer-operated assembly equipment. The auditor notes that prior labor costs for similar effort was $500,000, plus an overhead which at that time was only at a rate of 100 percent.

The total in that situation, though, would amount to $1 million, versus in this proposal a total reduction, if one looks at both the labor and the overhead combined, of $250,000—$1 million less $750,000.

I would point out that this is an illustration of a circumstance where the overhead rate has jumped tremendously, but where one should not get too excited without looking at the circumstance, because the total cost in that circumstance has been reduced.

The labor hours proposed here were accepted. The auditor then reviewed the labor rates by comparing them with payroll records, union agreements, and economic forecast data provided by Data Resources, Inc. The contractor has proposed an increase of 10 percent in labor rates for the fiscal year. Our audit forecasts indicate that only a 5-percent increase is reasonable, and the excess is questioned.

Labor overhead at 650 percent proposed reflects an increase from the historical experience, from about 100 percent to the 650 percent, because of the acquisition of the computer-operated assembly equipment. The new equipment significantly reduced the labor requirement. The auditor reviewed the correlation between the overhead pool and two allocation bases: one, the proposed continuing use of direct labor; and an alternative use of machine hours. The auditor found a much closer relationship here to machine hours.

I would point out that the review of allocation bases is an extremely sensitive part of the analysis of overhead allocations, and it has been the subject of a special initiative created by the Deputy

Secretary of Defense, calling for special emphasis, reassessing the allocation bases used by all of our contractors. This illustrates a circumstance where that has been effective and has resulted in a recommendation to change the base.

Here the auditor also reduced the expense pool to reflect the estimated travel cost associated with the accounting deficiency mentioned earlier. And since there were no direct travel requirements shown, the entire amount shown in the indirect pool which should have been charged to direct was questioned.

The recommended machine hour overhead rate was applied to the machine hours estimated by the Government engineer to arrive at an acceptable overhead of $550,000. The excess amount that was proposed is questioned.

There is also a line item in this proposal, as is typical of proposals, for cost of money. It is a calculated amount done in accordance with cost accounting standard 414, and the proposal would be using the current rate of 12.125 percent of the net book value of capital assets.

After adjusting the factors to reflect the change in the labor overhead allocation base, the factors were applied to accepted base costs and the excess proposed is questioned.

G&A is proposed here at 13 percent or $176,000. They are basing it on a projection of prior-year costs. The auditor reviewed these and found that typically the G&A expenses include about 15-percent unallowable costs which are not screened out by the contractor. There is a report on noncompliance with cost accounting standard 405 outstanding. A rate of 11 percent is recommended.

The proposed G&A allocable to questioned base costs is questioned. In addition, the difference between the proposed and recommended rate applied to the remainder of proposed costs is questioned.

The next item on the proposal is profit. The profit proposed here equals 14 percent of proposed costs. Since profit is a matter of negotiation, DCAA does not make a recommendation regarding this element. However, we do provide comments which we believe will be helpful to the negotiator in applying weighted guideline provisions and other considerations.

Typically, some of the comments which might be made are as follows: The contractor has realized a profit of about 9 percent on two similar prior contracts. Since the contractor has experienced successful completion of two similar contracts, overall risk here should be low.

At the Government's recommendation, the contractor converted its labor-intensive assembly operation to the computer-operated assembly. The contractor expressed concern that the substantial investment would result in lower profit. Since the contractor is not a participant in the Industrial Management Improvement Program, no commitment has been made regarding this investment. There is, of course, a significant increase in cost of money resulting from the procurement.

The contractor here has not cooperated with the Government by complying with Cost Accounting Standard 405 requirements to exclude unallowable costs. Consequently, more Government resources have been spent identifying the unallowable costs, and we would certainly hope that we would have the contracting officer's support in getting that situation corrected.

The contractor has also failed here to act on Government recommendations to improve the efficiency of the material handling and control system.

These point out some of the typical types of comments which might be provided to a contracting officer. I would also like to point out that the DOD does have an indepth review of profit policies going on. This is being conducted in the Defense Finance and Investment Review, commonly called DFAIR, where they are in particular giving consideration to the development of and possibly using a return on investment approach to setting profit in the contract process.

To conclude this statement, I would like to affirm to you that we are doing the best we can to satisfy our fiduciary responsibility to the taxpayers. What is needed, I believe, is a truly cooperative effort on the part of all participants in the defense procurement process to make it clear to all the taxpayers that we will not tolerate padding or gold-plating in contract cost estimates.

While contractors should be able to expect recovery of allowable costs and a reasonable profit, they should join with us in gaining public trust that profits are earned through management of contract performance rather than by manipulation of cost estimates.

Thank you.

[The prepared statement of Mr. Newton follows:]

PREPARED STATEMENT OF FRED J. NEWTON, DEPUTY DIRECTOR, DEFENSE CONTRACT AUDIT AGENCY

Mr. Chairman and members of the subcommittee, I appreciate the opportunity to appear before you to describe how DCAA audits contractor cost estimates

We review and report on over 28,000 contracts pricing proposals each year. They totalled over $272 billion last year. During that year, negotiations using our audit recommendations resulted in savings of nearly $7 billion.

I would first like to direct your attention to the exhibit attached to my statement. It illustrates the contract audit of a contractor's price proposal and covers most of the types of audit considerations mentioned in the statement.

DCAA initiates a review of cost estimates in connection with the award, administration, modification, or repricing of a Government contract based on a procuring contracting officer's (PCO) request for field pricing support. Field pricing support involves analysis of the contractor's price proposal by any or all of the field technical and professional specialists, which includes the contract auditor. During coordination of the PCO's request for audit review of a prime contract proposal, the needed coverage of any significant proposed subcontract cost will be a major consideration. Depending upon the contractor's basis for the proposed subcontract costs, the review may be made only at the prime contractor plant or may also require review at some or all of the major subcontractor's plants. Any Government review of proposed subcontract costs does not relieve the prime contractor of its responsibilities.

During the planning for a review of a contractor's price proposal, the auditor considers the total audit environment, including the following pertinent factors:

(1) The adequacy and reliability of the contractor's cost accounting system and the related financial statements.

(2) The strengths or weaknesses of the contractor's estimating system.

(3) Results of audits of contractor operations for efficiency, economy, and effectiveness as they may affect future costs. (The Agency has developed audit guidance for over 20 operational areas. We employ industrial engineers and computer experts for special assistance in these types of audits.)

(4) Vulnerability and risk assessment of the contractor based on such matters as prior experience, current trends, materiality of cost elements, and type of contract being considered for award (i.e., fixed price or cost type).

Preliminary to the detailed examination, the auditor performs certain overall tests of the contractor's estimating methods and procedures, such as:

(1) assuring consistency in methods used for estimating costs and the methods used for recording or accounting for such costs,

(2) assuring consistency in classification and treatment of costs as direct charges versus indirect,

(3) determining the adequacy and effectiveness of the contractor's system of controlling costs and whether the projected level of costs is considered in preparing cost estimates, and

(4) determining whether or not the contractor has cost reduction programs (e.g., work simplification, energy conservation) and has considered specific cost reductions anticipated from them.

Now, let me highlight some of the audit procedures we employ in evaluating specific elements of the contractor's proposal.

First, regarding direct material cost estimates, the contractor generally submits a bill of material which contains a detailed listing of the types and quantities required for raw material and the each component and part. It may also include allowances for expected losses, defects, scrap generated or other additives to the basic material requirement. When the estimate relates to a follow-on procurement and prior experience exists, the auditor tests for prior reductions achieved by the contractor in negotiating with vendors/subcontractors. On the other hand, estimates for completely new products usually involve technical determinations, and in these instances the auditor requests assistance from a Government technical specialist to review the need for the items, the possibility of "goldplating", and source selections. The auditor is also alert to instances where a proposal may be excessive because of unreasonable pyramiding of costs and profits. This may occur between divisions, plants or subsidiaries of a company or between subcontractors and upper-tier contractors.

Next, the auditor reviews proposed direct labor cost estimates by evaluating both the proposed hours and the proposed labor rates. If the contractor is proposing on a follow-on contract, the labor estimate should be based on prior experience, adjusted for expected changes for future work. In this situation, the auditor considers prior lot cost information, operation time and shop methods, operation time standards, and the contractor's labor productivity in applying appropriate quantitative methods such as improvement curves. The auditor also makes tests to assure that proposed labor hours are relatable to detail work statements and work breakdown structures. Assistance from a technical specialist may be required with respect to the classification of labor proposed and certain quantitative aspects; the auditor's tests might include comparisons with similar commercial functions.

Contractors may prepare labor rates for use in computing the estimated direct labor cost portion of all proposals to be submitted during a specified period of time. Use of pre-established rates recognizes a continuing uniformity in operations and promates consistency in estimating methods, and compliance with applicable cost accounting standards. However, there are limitations on the use of such rates since their use presupposes stable direct labor production and cost conditions that follow a normal pattern, and deviations from that pattern will not materially affect the direct labor cost. Similarly, the auditor does not automatically accept the cost impact of wage agreements between the contractor and its unions without analyzing current and past trends and determining their future significance. In assessing general economic trends, the auditor uses information from economic services such as Data Resources, Inc. The results of periodic compensation system reviews are also considered in evaluating the reasonableness of both payroll rates and fringe benefits.

After the direct costs are estimated, the contractor applies a rate for absorption of the pools of the estimated indirect costs (overhead) that are allocable to each contract. These indirect cost pools include manufacturing expense, engineering expense, tooling expense, material handling expense, selling expense, and general and administrative expense.

Generally, the most significant element of an audit of overhead is the review of the allocation base. An appropriate base or understatement of the base amount used to calculate the rate may result in large variations in amounts allocated to particular contracts. Recognizing the sensitivity of allocation bases, the Deputy Secretary of Defense established an initiative on 31 December 1984 calling for a centrally directed review by DCAA of methods used by contractors to allocate overhead costs to contracts. In addition, DCAA auditors routinely analyze historical cost data, contractor budgetary data, and sales forecasts (with input from Government procurement organizations) to assure that allocation base amounts properly reflect business volumes.

The auditor's review of individual indirect cost elements includes a comparison of these costs with prior experience and a determination that expressly unallowable costs have been excluded pursuant to requirements of cost accounting standard 405. The auditor responsible for reviews of proposals submitted by a division of a contractor obtains the necessary assist audit of any estimates of corporate allocations to the division.

The contractor is entitled to estimate an amount for cost of money which is an imputed cost determined by applying a cost of money rate to facilities capital employed in support of Defense contracts. It is derived from a rate published by the Treasury Department and is uniformly imputed to all contractors. The auditor assures that the historical bases of proposed net book values of facilities are traceable to the contractor's financial statements and supported by the accounting records. He also assures that the allocation bases and current cost of money rate are proper. Auditing the cost of money estimate is a relatively simple mechanical exercise.

The auditors do not make specific recommendations on profit. We do, however, make comments on matters affecting the weighted guidelines method generally used by contracting officers in computing the profit objective. For example, the auditors point out apparent matters bearing on risk such as significant subcontracted effort with little prime contractor involvement.

At the conclusion of the review, an audit report is prepared which decribes the purpose and scope of audit and summary of audit results. The auditor's cost determinations are classified as costs questioned, costs unsupported, or costs unresolved. Those amounts on which audit action has been completed and which are not considered acceptable as a contract cost are shown as questioned costs. Those items for which the contractor does not furnish sufficient documentation to enable a definitive conclusion are classified as unsupported. Costs are reported as unresolved when assist audits have not been received or there are significant, incomplete subcontract pricing actions.

Where special circumstances have a significant adverse effect on the conduct of the audit or its results, these situations are identified. Examples of such items are: lack of access to contractor records, time limitations on the scope of audit, and inability to obtain a Government technical report. DCAA's reporting standards require that the auditor express an opinion on the adequacy of submitted cost or pricing data and their compliance with Cost Accounting Standards and Federal Acquisition Regulation Subpart 31. Where such cost or pricing data are inadequate or significantly adverse conditions were encountered during the review, the auditor will state in the report that the proposal is not considered acceptable as a basis for negotiation of a price.

Contract audit effort does not end with the issuance of an audit report. We encourage contracting officers to invite the auditor to participate in negotiation conference discussions of the cost estimates. Concerted efforts to increase such participation during the past 4 years has clearly demonstrated significant tangible benefits. The percentage of exception sustained has risen as follows:

Fiscal year:	Percent
1981	53.5
1982	55.8
1983	56.3
1984	64.0

DCAA experience in reviewing contractor cost estimates has led us to identify errors in three categories: (1) simple mistakes, (2) system defects, and (3) fraud.

Regarding the first, correction is accomplished in the instant pricing action. The impact of system defects is measured and reflected in recommendations on the instant pricing action, and separate recommendations are reported to correct the deficiencies. A procedure for investigation referral of instances where there is a reasonable basis for suspicion of fraud has been coordinated with the Defense Procurement Fraud Unit and other investigative organizations.

A number of initiatives have been established within the Department of Defense toward assuring that Defense contract negotiators have the best possible information available to assess and reduce contract costs in pricing actions. One initiative established by the Deputy Secretary of Defense calls for indepth "should cost" reviews of overhead at four major contractor plants. DCAA is participating with the Defense Logistics Agency and the services in these reviews. Another initiative in progress is the Industrial Management Improvement Program (IMIP) which has the objective of encouraging contractors to invest in more efficient equipment and processes. DCAA is participating in establishing criteria for measuring the results of such investments. Another initiative is a major study of contract financing and profit, called the Defense Finance and Investment Review (DEFAIR), with the objective of minimizing the incentive to increase profit by increasing costs. DCAA has provided an audit manager to participate in this review.

To conclude this statement, I would like to affirm to you that we are doing the best we can to satisfy our fiduciary responsibility to the taxpayers. What is needed is a truly cooperative effort on the part of all participants in the defense procurement process to make it clear to all the taxpayers that we will not tolerate "padding" or "goldplating" in contract cost estimates. While contractors should be able to expect recovery of allowable costs and a reasonable profit, they should join with us in gaining public trust that profits are earned through management of contract performance rather than by manipulations of cost estimates.

ILLUSTRATION—DCAA AUDIT OF CONTRACTOR PROPOSED COST

[Thousands of dollars omitted]

Elements of proposal	Contractor's proposal	Results of audit review (note 1)			Reference
		Questioned costs	Unsupported costs	Unresolved costs	
Material	500	43	20	100	Notes 2 and 3
Material overhead (20 percent)	100	15			Note 4
Direct labor	100	5			Notes 5 and 6
Labor overhead (650 percent)	650	100			Note 7
Subtotal	1,350	163	20	100	
Cost of money	100	20			Note 8
General and administrative (13 percent)	176	45			Note 9
Total cost	1,626	228	20	100	
Profit	228				Note 10
Total proposed price	1,854				

Notes: 1. a. The results of audit are qualified to the extent subcontract costs proposed may be questioned (see note 2) and to the extent of the impact of a deficiency in the contractor's accounting system regarding travel cost allocation. The contractor charges all travel cost indirect. We have recommended that accounting procedures require direct charging of those travel costs specifically required for contract performance. An estimate of the impact has been questioned in our review of labor overhead (see note 7).

b. The results of audit incorporate the findings of a technical review performed by an engineer from the Defense Contract Administration Services Office.

2. a. Material costs include a proposed subcontract for $100,000. The amount is unresolved. An assist audit of the subcontract proposal has been requested. The results are expected within 2 weeks and will be the subject of a supplemental report.

b. Material costs include a proposed subcontract for $20,000. The amount is unsupported. The subcontract is for a defrost element not required in prior versions of the proposed system. The contractor has not yet developed the configuration requirements or selected a subcontractor. The Government engineer advises that insufficient information is available for a reasonable estimate. We recommend that the defrost element be the subject of a separate review and negotiation after information is available.

3. The contractor presented a detailed bill of material totalling $380,000 supported by current quotes from proposed vendors. The following costs are questioned:

a. The Government engineer identified part X as being unnecessarily gold plated. The proposed cost for gold plating is questioned	$5,000
b. In examining historical costs, the auditor observed that many of the vendors are willing to reduce quoted prices in negotiation. Experienced reductions have averaged 10% of quoted prices. Costs representing that ratio are questioned	37,500
Total	$42,500

4. a. A material overhead rate of 20% of direct material cost is proposed for CFY 1986, the period in which all of this proposed contract is to be performed.

	Proposed (20 percent)	Questioned	Recommended (18 percent)
Total direct material	$200,000,000	0	$200,000,000
Overhead pool:			
Indirect labor	15,000,000	2,000,000	13,000,000
Fringe benefits & taxes	5,250,000	700,000	4,550,000
Depreciation	10,000,000	0	10,000,000
Other	9,750,000	0	9,750,000
Total	$40,000,000	0	$37,300,000

Estimates of total direct material were compared with contractor budgets, Government acquisition office data, and historical costs. Overhead pool elements were compared with historical costs, supporting documents, and the results of related DCAA audits. Last year, DCAA performed an operations audit of the contractor's material handling and control system. Changes were recommended which would increase efficiency and reduce indirect labor requirements by $2 million in fiscal year 1986. Since the contractor has not acted on the recommendation, the amount of savings available is questioned along with related fringe benefits and taxes.

b. The proposed overhead allocable to questioned material costs is questioned ($8,600). In addition, the difference between the proposed and recommended rates (1.3 percent) applied to the remainder of proposed costs is questioned ($6,000). For convenience of presentation, overhead allocable to unsupported and unresolved costs is not shown. The recommended 18.7 percent rate should be applied to any of those amounts eliminated.

5. Direct labor hours proposed were compared with detail breakdown schedules (reviewed by the Government engineer) and with historical cost records. Labor hours have been reduced significantly because of recent acquisition of computer operated assembly equipment. Prior labor cost for similar effort was $500,000 (plus overhead at 100 percent). Labor hours proposed are accepted.

6. Direct labor rates were compared with payroll records, union agreements, and economic forecast data provided by Data Resources, Inc. The contractor proposed an increase of 10 percent in labor rates in CFY 1986. Audit forecasts indicate that only a 5 percent increase is reasonable. The excess is questioned.

7. Labor overhead proposed reflects an increase from historical experience of about 100 percent to 650 percent because of significant acquisition of computer operated assembly equipment. The new equipment significantly reduces the direct labor requirement. The auditor reviewed the correlation between the overhead pool and two allocation bases (the proposed continuing use of direct labor and alternative use of machine hours) and found a much closer relationship to machine hours. The auditor also reduced the expense pool to reflect estimated travel costs which should be charged direct to applicable contracts. The proposed contract does not identify any travel requirements. A recommended machine hour overhead rate was applied to machine hours estimated by the Government engineer to arrive at acceptable overhead of $550,000. The excess proposed is questioned.

8. Cost of money is calculated in accordance with Cost Accounting Standard 414 (12.125 percent of the net book value of capital assets). After adjusting the factors to reflect the change in the labor overhead allocation base, the factors were applied to accepted base costs. The excess proposed is questioned.

9. General and administrative expenses are proposed based on a projection of prior year costs. Those costs typically include about 15 percent of unallowable costs which are not screened out by the contractor. A report on noncompliance with Cost Accounting Standard 405 has been issued. A rate of 11 percent is recommended. The proposed G&A allocable to questioned base costs is questioned ($21,000). In addition, the difference between the proposed and recommended rate (2 percent) applied to the remainder of proposed costs is questioned ($24,000). For convenience of presentation, G&A allocable to unsupported and unresolved costs is not shown. The recommended 11 percent rate should be applied to any of those amounts eliminated.

10. Profit proposed equals 14 percent of proposed costs. Since profit is a matter of negotiation, DCAA does not make a recommendation regarding this element. However, the following comments are provided for consideration in negotiation:

a. The contractor has realized a profit of about 9 percent of costs on two similar prior contracts.

b. Since the contractor has experience successfully completing two similar contracts, overall risk should be low.

c. At the Government's recommendation, the contractor converted its labor intensive assembly operation to a computer operated assembly. The contractor expressed concern that the substantial investment would result in lower profit. Since the contractor is not a participant in the Industrial Management Improvement Program (IMIP), no commitment has been made regarding this investment. There is, of course, a significant increase in cost of money resulting from the acquisition.

d. The contractor has not cooperated with the Government by complying with Cost Accounting Standard 405 requirements to exclude unallowable costs. Consequently, more Government resources have been spent identifying the unallowable costs.

e. The contractor has also failed to act on Government recommendations to improve the efficiency of the material handling and control system.

Senator QUAYLE. Thank you very much, Mr. Newton.

Let me ask our military friends, how often do you apply a should-cost analysis? Is this basically to the major systems? Do you have a standard rule of thumb of when you use a should-cost analysis, and how is that utilized?

Do you want to start, General Sharp?

General SHARP. Yes, sir. Our rule of thumb is $50 million contracts, noncompetitive, we use the should-cost analysis.

Senator QUAYLE. Just if it costs $50 million or more and noncompetitive?

General SHARP. Yes, sir.

First and fourth production runs is a new piece of our policy on that. So we are doing a second should-cost on those major systems.

Senator QUAYLE. Does that mean whether they are competitive or noncompetitive, or are you doing it for all systems on that first and fourth run of the production?

General SHARP. We are doing it at the point of award. The fourth one usually is noncompetitive in the major system arena.

Senator QUAYLE. That is noncompetitive as well?

General SHARP. Yes.

Senator QUAYLE. Now, Admiral Sansone, what about the Navy?

Admiral SANSONE. Yes, sir. Let me quote, if I may, from our policy. We do not have a dollar threshold established for conducting a should-cost study. We specify certain conditions that, when present, suggest consideration of a should-cost study. These conditions are as follows:

Where some initial production has already taken place; where the contract will be awarded on a sole source basis; where there are future year production requirements for substantial quantities of like items; where the items being acquired have a history of increasing cost; where the work is sufficiently defined to permit an effective analysis and major changes are unlikely; sufficient time is available to plan and conduct a should-cost analysis adequately; and personnel with the required skills—this is very important, sir—personnel with the required skills are available or can be assigned for the duration of the should-cost analysis.

Now, those are the conditions under which we conduct our should-cost analyses. And I must indicate to you that we have not conducted very many of them. But we have conducted pieces of should-cost analyses on several programs even though they all were not full-blown should-cost studies. We are about to launch a should-cost analysis, two of them as a matter of fact, in response to Deputy Secretary of Defense Taft. And my calculations are that it is going to take approximately 50 people a period of about 4 months to conduct one.

Senator **Quayle**. To conduct one should-cost analysis?

Admiral **Sansone**. Yes, in an overhead account.

We have not announced which ones yet, Mr. Chairman, if I may refrain from identifying the specific contractors.

Senator **Quayle**. On an overhead account?

Admiral **Sansone**. In overhead, total overhead.

Deputy Secretary Taft has asked each service to conduct one. The Navy is going to conduct two. We have found likely candidates based on the criteria, and we think that the effort will be worthwhile, but it is an investment in resources and, more importantly, the right kind of resources.

Senator **Quayle**. So you do not have a should-cost estimate for programs presently?

Admiral **Sansone**. Not a full blown in-depth should-cost estimate for all programs, Mr. Chairman. We do have cost estimates, cost estimates generated by our own cost estimates.

Senator **Quayle**. I know you have cost estimates, but not the should-cost?

Admiral **Sansone**. Not a full should-cost per se for every program.

Senator **Quayle**. The Army has it for noncompetitive programs over $50 million. What about the Air Force?

General **Weiss**. We use the same threshold, at $50 million. We generally conduct should-costs, major weapons systems programs. We require that should-cost be a topic at the business strategy panel meetings, and then if in fact the should-cost is not done on a program that is in excess, or a contract in excess of $50 million, that the file be documented.

Now, we have done should-costs since 1982 and we have about five or six should-costs planned for fiscal year 1985. We feel that they are very labor intensive and that you just cannot do a should-cost on any given program. You have to have the reasons, that you see prices increasing, you see inefficiencies, in order to do it.

So we try to look at everything that is over $50 million in terms of contract value, then determine if the prerequisites for conducting a should-cost exist, and if so then we conduct it.

Admiral **Sansone**. Mr. Chairman, might I amplify one thing? When I indicated we have conducted very few should costs, the number precisely is three should-cost studies in 1984: the HARM missile, the AN/U4K-21 display system, the Aegis weapon system.

We did two in fiscal year 1983: a sonar and a cost analysis of an entire firm in terms of the firm's indirect costs.

So we have done five in the last 2 fiscal years.

Senator **QUAYLE**. On those five you have done on a should-cost basis, have the actual costs come in under where the original price was suggested?

Admiral **SANSONE**. Yes, sir.

Senator **QUAYLE**. In each one of those cases?

Admiral **SANSONE**. Each one of the should costs—I might define it for you—gave an objective to the contracting officer which was lower than proposed cost in the contractor's proposal. So I think the answer to your question is yes, sir. In each case the should-cost results were beneficial in showing what actual cost could be for that system vis-a-vis what the contractor proposed.

Senator **QUAYLE**. General Sharp, is that the case with the Army, where you have negotiated a should-cost contract or used the should-cost analysis in coming up with a contract?

General **SHARP**. Yes, sir, we have found them to be extremely cost-effective, if you would, in our use of them. I agree completely with the observation that they are labor intensive. They take a significant number of highly skilled people a significant amount of time.

Our average has probably been a team of say 20, although we have had teams that are much, much larger than that in certain cases. And they are there for periods of weeks in doing this true in-depth on-site analysis of a contractor's proposal.

But back to your original question, sir, we have found that over the years it has been a ratio of about 70 to 1 payoff. That is, the reduction in what we would have expected the price to be on the contract, the reduction from that to what we actually negotiated based on the should cost, compared to the actual cost of fielding the should-cost team.

Senator **QUAYLE**. That is a rather astounding figure, 70 to 1. If you carried that through on a lot of other programs——

General **SHARP**. Now, what I am talking about is the cost, just the cost of fielding the team.

Senator **QUAYLE**. You are talking about the 70-to-1 savings. Is that not the savings from the original contract, the savings from the original contract as compared to the costs of performing——

General **SHARP**. Performing the should cost. The actual savings that we make in the negotiation compared to the cost of fielding the should-cost team, and that is the cost of performing the analysis.

Senator **QUAYLE**. That is the 70-to-1 ratio?

General **SHARP**. Yes, sir. We have averaged somewhere in the 12- to 16-percent range as far as contract value is concerned.

Senator **QUAYLE**. Is that a fair standard in the Navy as well, about 70 to 1, would you think, on those five should-cost programs?

Admiral **SANSONE**. Mr. Chairman, I really cannot comment on what the Army's numbers are. We have never accumulated the data to show what the payback is for the investment. We have made the decision that a should-cost study should be done and then gone out there and done the study. My assessment is the results of the should-costs studies have been very useful to the contracting officer in negotiating with the contractor.

I am not sure we have that data, but I would be pleased to look, and if we do I would be pleased to submit it for the record, sir.

[The information follows:]

SHOULD-COST STUDIES

The Navy has never accumulated data documenting cost/benefit or payback with respect to the cost invested in performing should-cost studies.

Senator Quayle. I would appreciate that.

General Weiss, what about it?

General Weiss. We find that where we selectively use should costs that they are very effective. It is very difficult to compare it against a non-should-cost supported negotiation versus one that is a should-cost supported negotiation. But where we have done that, we feel that we have gained an additional 15 percent reduction in contract price.

And that is kind of a wag. It is difficult to measure it. Now, we do get a decrement in every negotiation. In the cases where we have done the should cost, there was a sense that that decrement was larger.

Senator Quayle. I realize that it is difficult to get an exact figure, but ballpark figures of 70 to 1, 15 percent. If that is the case, what are the reasons why we should not accelerate a should-cost analysis on many more programs than we are doing right now, if we get those kinds of savings?

General Weiss. Because not all programs have the benefits—or the propensity to offer you those savings. When you have a contract where you are using in-depth analysis and you are doing the negotiations and you are in a second or third buy and you are coming down a learning curve as steep as you expect it or steeper through negotiation, the should-cost may not be necessary.

Where the contractor is automating his operations in lieu of using intensive labor techniques, it may not be necessary. So the key, I think, is that it is not a panacea for everything.

Senator Quayle. I understand that. Are there any impediments? You talked about the labor intensity, and General Sharp reiterated that, of the should-cost analysis. Are there any major impediments to expanding the should-cost analysis to other programs, if in fact you wanted to do it?

Now, I am not saying you want to do it for every program. Can you do it now? Do you have the capabilities? You do not have the capabilities now?

General Weiss. We do not have the available skills and resources, depending on what you mean by "expansion," to increase the number——

Senator Quayle. You look at it from a decisionmaking point of view and you say: OK, this program ought to have a should-cost analysis; we would probably end up saving money. It comes back saying: Well, we have our people fully loaded right now, we do not have the time, we do not have the capabilities to do that, and therefore somebody has to make the decision that we do not go forward with that on a cost benefit ratio.

So in essence, I think what you are saying is that there are some impediments.

General WEISS. Resources and experience.

Senator QUAYLE. That gets me to my next question. Would there be a possibility of contracting this out to the private sector, to get some independent cost, should-cost analysis, where in fact we do have a full load presently in the services and we cannot go forward? Would that be a possibility?

General WEISS. I think it is a possibility. We have done something similar to that. We have brought on some consulting people who are retired people who worked in various phases of manufacturing and used them in the should cost or negotiation process to help us. We have not contracted out a whole should cost.

I personally believe that you are running into a conflict of interest situation potentially, bringing in one contractor, even with a hardware exclusion clause, to go in and look at how another contractor is——

Senator QUAYLE. Obviously, these people would not be contractors. There is all sorts of expertise on management and efficiency that are not involved at all in defense. They just know what the bottom line is. You have all these efficiency experts around. They are in nondefense as well as defense.

I would not think of one contractor going in and looking at another contractor and being able to gain valuable information. I am talking about somebody that is truly independent and has the resources and capabilities of doing something like this. It might be beneficial.

I know in business a lot of times you hire people to come in and take a look at your shop and make recommendations to you. I would think that we might be able to utilize those same kinds of services on a contracting out basis.

Admiral Sansone?

Admiral SANSONE. With respect to using contracted assistance, in the two should-costs that we are going to perform this fiscal year I am looking to use some contract assistance, because as I look at our available in-house Navy expertise I find that we don't have sufficient quality and quantity of people at the right location, at the right time.

When we look to expand this effort, if we do, we have to look at how to develop the right kind of people and in the requisite numbers to do what we may need to do further in the should-cost area. It is impossible to grow an industrial engineer or a manufacturing or production engineer overnight. That just does not happen. We have to recruit and train those people and plan on them and then use their capabilities to the fullest.

I would offer that there are some alternatives to should-cost studies. When you look at the factory floor and look at maximum efficiency and effectiveness on a factory floor, there are things that can be done to improve efficiency. We have a program in DOD that I think is becoming very effective in this area, and that is the Industrial Modernization Incentive Program—IMIP. Under this program we are incentivizing contractors to make capital investments on the factory floor to improve productivity and reduce systems costs.

In return for that investment, we will share savings with the contractor under a predetermined negotiated agreement. We will also, should the contractor need some protection, provide him some investment protection in terms of a buy-back of the investment should something catastrophic happen.

This is a very effective program throughout DOD. We have incentivized, on a test program 1.5 billion dollars' worth of capital equipment investment, and the return, auditable by DCAA, is going to be about $5 billion. That is a pretty fair return on that investment.

Senator **QUAYLE**. I would like you to give a detailed submission of that.

Admiral **SANSONE**. I would be happy to.

I happen to chair the triservice IMIP committee, of which these gentlemen are members. IMIP was one of Mr. Carlucci's initiatives, carried on by Mr. Thayer, carried on by Mr. Taft. It is a program to incentivize capital investment in productivity enhancing equipment.

I would be happy to give you something for the record, sir, or a briefing for the subcommittee, whatever is your pleasure.

Senator **QUAYLE**. Submit it for the record, and if we want to get a briefing we will.

[See appendix A, p. 51.]

Admiral **SANSONE**. Fine, sir.

That is just one alternative to should-cost. There is another one. The free and open marketplace creates for us the forces to give us reasonable prices. The more we take advantage of a competitive environment, as we are doing in shipbuilding—85 percent of the shipbuilding program was competitive in fiscal year 1984, and it is going to be even higher in the 1985 through 1989 timeframe—the more the forces of competition will dictate fair and reasonable prices.

As long as we have the force of the marketplace working, then I think efficiencies will result. Now, is that going to necessarily totally guarantee that we will have the lowest cost? Not necessarily. Selectively, we will have to do some should-cost studies to buttress what competition gives us, if only to ensure that competition is not just giving us a paring down of the same old costs, but rather be giving us a new cost structure derived from the most efficient base line.

I think there are some alternatives to should-cost which the services have available to them, and I think we are using them.

Senator **QUAYLE**. Senator Bingaman?

Senator **BINGAMAN**. Thank you, Mr. Chairman.

Let me ask about the problem of underestimating costs. I know, General Sharp, you referred to this on page 6 of your testimony. You state that:

> While it appears that many Government analysts are very good at finding areas that are overpriced, only a few ever detect underestimating.

And then you go on to indicate that perhaps this is a result of the training system that places great emphasis on teaching techniques to discover overpricing, and that you are going to have the Army Procurement Research Office look into this area.

Would you agree that there are some incentives in the system, the way our defense contracting system operates, for a program manager and a contractor both to be optimistic about the cost at which they can bring a program in?

General **Sharp**. Yes, sir; there are definite incentives to be as optimistic as you can. But I also think that there are incentives to be realistic as well, and I sense that our program managers are becoming much more realistic these days than they have been in the past.

Senator **Bingaman**. Now, obviously what I am getting at here is the series of testimony we got with great fanfare last year from Mr. Spinney, who got a lot of publicity in Time magazine and other places for his report, the name of which I believe was "Plans-Reality Mismatch," where he said that we seldom anticipate what the real cost of anything is going to be and therefore we cannot make good judgments as to whether or not to buy it; that once people get their foot in the door, then the price goes up and up; and once we start buying a program the price goes up and up.

I am just wondering the extent to which you think this is a problem, the extent that you think we should be doing something about it. Or was his testimony discredited in your view?

Is this a flash in the pan, something we should not concern ourselves with?

General **Sharp**. Yes, sir. I am not familiar with his testimony, but on the issue, sir, I think that we recognize the seriousness of the problem that you are addressing here, and it is one that we are doing our best to grapple with in a realistic kind of fashion.

Now, I am sort of just giving you motherhood here, if you will, but I do not know of anyone who is very deliberately underestimating the cost in order to get it through the system. I do not know of any case where that is happening today.

Senator **Bingaman**. Let me give you one example. I think an example Spinney mentioned was the AMRAAM, advanced medium-range air-to-air missile. And he was indicating, I believe, that he thought that was underestimated. And in fact, the cost estimates we received this year indicate that he was right, that the cost is going up.

Maybe you could tell me. You say we are doing everything we can to deal with this. What are we doing? I see you say that you intend to have the Army Procurement Research Office look into this area. Is there anything else that we are doing?

General **Sharp**. I intend to have the PRO people get into the entire system and see if they can discover the reason for what I perceive to be a mind set on looking at the estimates in the sense of trying to drive them down, finding out what the unrealistic parts are on the high side, but to find out what are the reasons for that kind of mind set. Why are we not looking at realism from both the high side and the low side? And I am going to have them look at that.

Senator **Bingaman**. Maybe the other witnesses would have a comment on what is being done to deal with this, if it is a real problem.

Admiral **Sansone**. In the Navy we are consciously looking at all of our programs for conversion to fixed price efforts. In a fixed price effort or a fixed price incentive effort with a very tight sharing arrangement and a very tight target-to-ceiling spread, then the contractor is sharing the preponderence of risk. In essence, if the company bets on recovering from a low estimate, then the corporation is betting itself. When you try to buy in, you are taking a very serious gamble.

Not so on a cost-type contract. And the Navy is consciously moving away from cost-type contracting in production to fixed price type contracting.

In betting the company one takes a very serious risk, and that is you could lose and in so doing you might lose a whole lot. The going-in plan for such a company might be to get even through changes. If you entered the program with an intentionally low cost or a low price, then you might want to get into a lot of changes and therefore open up the contract, renegotiate, and make yourself whole.

To counter this, the Navy has instituted over the past 2 or 3 years many checks and balances that will preclude many changes. We baseline, we freeze design. We have various levels of approval for changes. In the Navy for instance, there are some levels of approval that are with the Secretary of the Navy himself, expecially for aircraft.

So I think that gives you some indication as to what we are doing to stop the problem.

Senator **Bingaman**. General, did you have any comment on this problem on what is being done in the Air Force? Maybe you could also comment on the AMRAAM example that I cited.

General **Weiss**. I figured you would ask that question, Senator.

Let me start out generically. There is a problem in buy-in. I think it is twofold. We are now talking about a competitive environment where we are doing the source selection and, while many people criticized the aerospace and defense industry as not being competitive, in some cases it may be too competitive on new weapons systems. And so contractors, in their enthusiasm and optimism in evaluating technical risk, err on the lower side of risk on what may be the real risk.

Again, you are looking out into the future. It is very difficult to tell. So I think that we in the Air Force in source selection look for those potential buy-ins. Our cost panels and engineering panels try to determine where they are.

We highlight that to the source selection authority. We compare it to our own independent cost estimates, where the independent estimate is very, very useful. And what we try to do is to use that and buy-ins as part of a past performance indicator: What has happened on prior contracts with this company in that particular area? And it can weigh against the contractor in terms of award under the instant contract.

Many people in industry believe the lowest price is always the answer, and unfortunately that is not true. We look at the technical input more and we look at the contractor's past performance.

We have a thing we call baselining in the Air Force. We have a contract between us and the contractor. Even more so, we have an agreement (analogous to a contact) among the user, (the case of the B-1B with SAC) with the Air Force Logistics Command, the Air Force Systems Command, the air staff, and sometimes the Secretary of the Air Force. Baselines help control program changes, not because that is where the contractor, if he does buy in, tries to get well.

So we limit the opportunity for the contractor to get well by trying to eliminate the amount of changes that occur in the program. We baselined the B-1B at $20.5 billion. We are staying within that and doing quite well.

With regard to AMRAAM, that was a competitive procurement between two prime contractors, who I think got optimistic in terms of technical risk. If we would have been able to continue to exercise the milestones and award the production options, I think we would have ultimately gotten to the point where we would have gotten AMRAAM at the price that was originally programmed.

There were problems in the tests and the Air Force, and I think others, decided that we would stop the program and continue in full-scale development. But I think there was some element of over-optimism.

Senator **Bingaman**. We have had some testimony by General Stansberry, who I gather used to be head of the Electronic Systems Division, and he talked about how he believed that there were golden numbers. And basically you come up with a number and say, this is what we have got to spend on this, and pretty much the work expanded or contracted to fill the number, whatever it was. So that it was not the cost of programs that was determining the pricing; it was the pricing that was determining the cost.

Do any of you have a comment as to whether he is accurate that such a phenomenon exists in the pricing of some of these weapons programs, or has he just become confused since he has gotten into civilian life?

Admiral **Sansone**. Jim Stansberry is never confused, Senator. He was a fine Air Force officer. I have known him personally for years.

There are two things that I think we want to distinguish when we are discussing how contract performance either meets with the scheduled dollars or it exceeds it. In one instance where a contract is underestimated going in, you have predetermined that you have an overrun. Let us set that aside for the moment. I think we know how to deal with that situation. We are dealing with it in terms of selection of contract type, the kind of cost analysis used and source selection processes we go through. We are also dealing with it by transitioning to fixed price contracting.

In the contract performance area, in my view, you have an opportunity to overrun there, too. Irrespective of the dollar value that you went in with, there is an opportunity for things to happen during contract performance.

Change the requirement and you will overrun. Either raise or lower the numbers of units or change the specification and you will probably have to reprice the contract. Change the delivery schedule, make it earlier or later, that is, delay the production because fewer units are going to be bought—you will change the pricing of the contract at that point as well.

So, irrespective of whether you go in with a very solid, realistic number, there are opportunities for the contract to overrun during performance. There are many things that can happen.

Poor contractor management is another thing that could possibly carry a contract into an overrun condition.

There are a lot of areas for overrun, and I wanted to make the distinction, if I may, between underestimating and poor contract performance because I think we know how to do the former. And I think we know how to do the latter; that is, control contract performance, but that is not totally within the program manager's prerogative or control.

Funds allocation is not in his prerogative; we take what we get. The quantity that we buy is by and large, not totally the program manager's prerogative, because we annually buy a quantity, rather than the full program quantity in 1 year. Program stability is not totally within our prerogative.

The specification, one might say, is within our control. But if you are changing the specification to meet a new and changing threat, then should the specification be changed? The answer is probably yes.

In summary, a lot of things can happen during contract performance to make a contract breach its dollar value.

Senator **Bingaman**. Thank you very much. My time is up. If any of you want to elaborate, I assume you could later.

Senator **Quayle**. Go ahead.

General **Weiss**. Just one point. The issue of overrun is a part of time and technical complexity. We are required to estimate program costs 4 or 5 years before we even really get into any hardware tests or demonstration, as a minimum.

You then go into full-scale development and production, and you are looking at programs that are 14, 15 years from the time the idea is a concept until you may see the production equipment rolling off the line in a mature way. Anybody who can estimate program costs 14 or 15 years out from now has to be either a genius or a magician, and that we get labeled with as cost overruns.

And I just beg your consideration of the fact that there are human errors that we have because we are frail, and we do the best job that we can.

General **Sharp**. Sir, I would just like to underline the point that this program stability is truly the key to efficient performance in our business. From the Government standpoint, from the contractor's standpoint, stability is really the key.

Senator **Quayle**. Senator Levin?

Senator **Levin**. Thank you, Mr. Chairman. And welcome to all of you.

Mr. Newton, my first question is to you. Apparently you testified or mentioned in your testimony that during 1985 Deputy Secretary Taft directed DCAA to conduct should-cost reviews of overhead costs at four contractor facilities. I am just wondering whether or not these reviews had ever been conducted before that direction from Deputy Secretary Taft. Is that something new?

Mr. **Newton**. The conduct of should-cost reviews of programs has been going on for some years from time to time. There has been testimony here indicating some of the should-cost reviews, but I believe that they have been addressed to a program, weapons system approach. The unique feature that we have in this initiative is to conduct an in-depth review of the should cost of overhead, bringing down the scope.

And to that extent it is unique, and there are at least four being planned in response to Deputy Secretary Taft's initiative.

Senator **Levin**. This is something that I have been harping on around here for a while, these overhead costs. And I am just wondering, then, before that direction there were no separate should-cost reviews of overhead costs by the DCAA, is that right?

Mr. **Newton**. We were not doing what is termed a should-cost review of this nature.

Senator **Levin**. Prior to this recent direction?

Mr. **Newton**. That is correct.

Senator **Levin**. When was that direction?

Mr. **Newton**. I believe it was dated December 31.

Senator **Levin**. Of last year?

Mr. **Newton**. Of 1984.

Senator **Levin**. Were the four construction facilities selected by DCAA?

Mr. **Newton**. No; the should-cost initiative calls for each of the services and Defense Logistics Agency to conduct should-cost reviews, and we are a participant in that review.

Senator **Levin**. Who picked the four facilities?

Mr. **Newton**. The services and DLA.

Senator **Levin**. I take it that one of the ways that we measure costs that has been used in the past is some test of reasonableness. And is it correct that the case law holds that there is a presumption of reasonableness if the cost has been incurred by a contractor, Mr. Newton?

Mr. **Newton**. As to the case law, not being a lawyer, I will have to skirt that one. But let me say squarely that from the DCAA standpoint the incurrence of cost does not create a presumption of reasonableness in our eyes. It is not accepted merely because it has occurred, and we have had success in questioning incurred costs.

Senator **Levin**. I am wondering if any of our other witnesses would agree with me that there is a presumption of reasonableness in the law as you understand it, once a cost has been incurred: And to put it further, according to the leading case on this subject, that there is a burden placed on the Government to prove unreasonableness, and it is a rigorous one?

Is that your understanding, anybody? Or is this analysis of the case of *Bruce Construction* v. *United States* faulty? What is the general understanding?

General **Weiss**. Well, within my understanding in the last 28, 29 years, it is that the incurrence of a cost is not a presumption of reasonableness. The test to an Air Force contracting officer is twofold: One is, is it a reasonable cost; and is it an allocable cost?

The fact that a company incurs a cost does not make it a valid cost.

Senator **Levin**. There is no presumption?

General **Weiss**. No presumption.

General **Sharp**. This is the first time I have heard of that.

Senator **Levin**. So much for the leading case of *Bruce Construction Co.*

We were getting into the question of overhead costs the other day, the issues in cost estimating. When you look at costs, one of the areas that you look at is overhead, and whether or not there is an incentive to keep that overhead down or to keep that overhead up, where profit is multiplied against the costs, including overhead.

I am someone who believes that if you look at the way we compute many of our contracts, that the larger your overhead costs you are going to be getting a larger profit generally. And that is why, as a common sense matter, our cost estimators try to drive costs down and industry tries to get their costs recognized in full.

I think that is what we are doing, is it not? Is not your effort to drive costs down, general?

General **Sharp**. Yes, sir.

Senator **Levin**. I presume industry is trying to validate their costs and to argue that whatever costs they can demonstrate are reasonable costs. Is that not their effort? And the reason that they want to do that is that they want to get reimbursed, No. 1; and No. 2, that their profit to some extent is figured as a percentage of their overall costs, is that not true?

General **Weiss**. Well, I think it is their judgment, sir. It is their judgment that these costs are going to be incurred over the ensuing period of the contract.

Senator **Levin**. But in part we also look backward as well as forward, do we not, in arriving at overhead?

General **Weiss**. Where we are in production of some hardware, where we have cost experience, one of the elements is to look at what costs have been incurred and then project out, but also to look at efficiencies and standards. I understand what you are saying, and I think the key is the fact that, when you look at, at least the Air Force, and I think it is true with the other services, about 84 percent of the dollars that we put on contract in fiscal year 1984 were fixed price type contracts; 41 percent were firm fixed price, where they are not trying to incur more costs if they are being incentivized to reap profit. They want to reduce costs; and 33 percent were fixed price incentive, where there is a limitation on total liability.

I would say there is an incentive for the contractor to reduce costs and thus for us to gain the benefit of those reduced costs in subsequent procurements. In the cost area——

Senator **Levin**. But in negotiating a firm, fixed price contract, we look at, do we not, what a contractor's costs are? And the contractor is going to argue with us: Look, these are my costs and it is going to be on the upside. And we are going to say: No, no, they should not be higher than this, and it is going to be on the downside. And we are going to negotiate somewhere in between, are we not? Is that not the whole negotiating process?

Am I wrong? They are trying to get more and we are trying to get them less?

Admiral **Sansone**. Would that it was only that simple, Senator.

Senator **Levin**. In general, are they not trying to get more and we are trying to pay less, putting aside the buy-in issue which Senator Bingaman talked about?

Admiral SANSONE. Let us talk about two separate circumstances.

Senator GLENN. I see a lot of contracting heads nodding yes back here.

Senator LEVIN. Is that something secret or hidden? I mean, I hope not. It is a free enterprise economy.

Admiral SANSONE. In a free enterprise economy where you have maximum competition operating, one could argue that there better not be a drive to increase costs or overstate because then the contractor is going to be noncompetitive and you will lose.

Senator LEVIN. I am talking about a profit-oriented economy.

Admiral SANSONE. I am not saying that in a profit-oriented economy it will not operate in the same way. I think it will.

Senator LEVIN. It is a fundamental issue. If we cannot get an agreement on this—most of our contracts are noncompetitive.

Admiral SANSONE. No, sir. Over 50 percent of our contractors in fiscal year 1984 were competitive.

Senator LEVIN. According to the figures I have, in 1984 the percentage of dollars expended in sole-source contracts was 57 percent; competitive negotiation, 37 percent; sealed bids, which is the ultimate competitive contract, 5 percent.

Now, I am not eliminating competitive negotiation. I agree with you there is some competition in competitive negotiation. As a matter of fact, along with Bill Cohen and a number of others around here, we made it clear in the law that competitive negotiation is competition. That is fine, I recognize that as competition.

But according to the statistics we have for 1984, of the percentage of dollars expended, 57 percent was in sole-source contracts. OK, so I agree with you that competition is the way to go.

But let us now talk about the real world, and the real world is that we have 57 percent of our dollars sole source. Now, in that real world, is it not true that our contractors are trying to get more and we are trying to pay less? I mean, the American taxpayers would assume we are trying to keep our costs down and they are trying to get reimbursed for as much as they possibly can. Is that not just basic?

General WEISS. Could I respond to that?

Senator LEVIN. Gentlemen, let me just ask you some questions. In other words, it is not that simple?

General WEISS. No; it is not that simple. What you are trying to do—first of all, the contractor when he submits a proposal has to comply with Public Law 87-653, the Truth in Negotiation Act. If he is loading costs into that proposal that are unacceptable, he is subject to defective pricing, and we have the DOD IG and the DCAA who are doing a lot in that area. So he is encouraged by the law, required by the law, to comply.

What he is trying to do in negotiations and what we are trying to do in negotiations is determine the amount of risk and place dollars equivalent to the amount of risk and come within a range of an understanding of what we both think the costs will come out to be.

Senator LEVIN. And what he thinks is usually higher than what we think.

General WEISS. Yes, because he wants to minimize risk.

Senator **Levin**. Whatever the reason, but he thinks it is higher than what we think. And so he is trying to show higher and we are trying to show lower. Why is that so complicated?

General **Sharp**. When we sit down at the negotiating table, sir, that is the conversation that we have.

Senator **Levin**. In that effort to look at his expenses, he is trying to show his expenses are reasonable and we are trying to show that they are higher than is reasonable, I presume in some cases. And we went into this issue last time: Is there an incentive, given that circumstance, for him to lower his costs, given the fact that his profit in these negotiated contracts is a percentage of his costs? We have not yet got a fixed agreement on that. I am not asking you fellows to agree.

But it seems to me that in many, many cases—I am not saying in all cases, but in many, many cases, probably the large percentage of our contracts—the incentive is not to keep costs down once you have a sole-source contract. The incentive is to get your costs reimbursed, not to keep costs down.

That to me is kind of fundamental, and I will not argue with you. You may or may not agree.

But we also put incentives in some contracts to keep costs down. We say: Well, that estimating process, the negotiating process, may not work to keep costs down, and so we are going to put an incentive in there, in some contracts. So we have incentive contracts.

And then the question comes: Does the incentive work, where our original estimating and negotiating does not do the job? Does the incentive pick up the slack? And that is what I want to talk to you about now, is the incentive contracts, if we can.

We have got an analysis from General Weiss, who was kind enough to take a look at some of the incentive contracts for us in the Air Force. And you looked, General, at 69 contracts, as I understand it, and 44 of them were cost plus incentive—excuse me, let me get the right name of the contract—fixed price incentive contracts.

Out of 69 fixed price incentive contracts, 44 of them came in over target, 6 at target, and 19 under target. Would you agree that that means that in two-thirds of the cases, roughly, that the incentive did not work as well as we would have like it to have worked? The target was what we thought it should have cost. In only about one-third or less did it come in under that, and in two-thirds it came in over that.

So would you agree that to some extent at least the incentive did not work? I do not mean that it did not work at all, but I am saying that to some extent it did not work.

General. **Weiss**. No, I would not agree.

Senator **Levin**. OK.

General. **Weiss**. And can I say why?

Senator **Levin**. Sure.

General. **Weiss**. The very fact that the parties agreed upon a fixed price incentive contract meant that during initial negotiations there was not an agreement between them as to what the price should be. So there was a variance. We normally tell our contracting people that if they can agree within plus or minus 5 percent, go to a firm, fixed price contract. If they can agree and it is in a range of plus or minus 10 to 12 percent, go to an FPIF contract.

In this case in the 69 contracts, only 8 were over ceiling. So in fact——

Senator **Levin**. Is that 8 of the 19?

General. **Weiss**. Yes, sir; 8 of the nineteen went over ceiling. So in fact, I believe the incentive did work. And this is a study that I initiated in Air Force Systems Command that reflects a base of completed FPIF contracts from the late seventies to the very early eighties, and at that point in time we were using shares and ceilings which were a little higher than we are using now.

We had a share ratio of generally 75–25. We are now looking at shares of 60–40 and in some cases 50–50. And I think you will find that under these share arrangements we are finding contractors very much more concerned with cost control.

Senator **Levin**. My time is up. Thank you.

Senator **Quayle**. Senator Glenn.

Senator **Glenn**. Thank you, Mr. Chairman.

General Weiss, I believe in response to a question from Senator Bingaman you indicated that in some cases there is too much competition. Would you elaborate on that a little?

General. **Weiss**. Well, I did not, sir, mean it that way. I think all the competition we can have is very good.

What I meant to say was sometimes, in the enthusiasm of the competitive environment, contractors do things that may not be very logical at the time. There is an enthusiasm to win a competition and they underestimate risk. And when they underestimate risk, they tend to underestimate cost and then, that is, you have a problem of a buy-in where neither the contractor nor the Government wins.

Senator **Glenn**. I do not disagree with you at all there.

General. **Weiss**. The point is that many people who kind of look at us critically say there is not enough competition. In fact, in many cases there is so much competition that we promote over optimism.

Senator **Glenn**. I thought maybe what you were referring to—and I will go to the aircraft example, where we have the flyoffs and some things like that these days, that we did not used to do back in the old days. And the very fact of that kind of competition is extremely expensive in itself and adds millions of dollars in expense, and maybe you get a better product and maybe you do not.

I have wanted to ask somebody to do a study of that for a long time. I will not do it today, but as to whether that really is paying off or not. It means we bring two contractors and two contracts way down the pike before we make a decision, if you require that kind of fly off.

And are you doing that now, and is that still part of the competitive process that you see into the future?

General. **Weiss**. Yes, I do, we are trying to avoid paper competitions. When you get to an aircraft competition—and I know your history in aviation. I am nonrated, but have spoken to people like Jim Abrahamson and other folks who have been involved in a flyoff, and it is a mixed bag. It is expensive, but it does reduce risk.

And we try to, at least in the Air Force—and we have no flyoffs planned at this point. We are trying to take all of our products and trying to build a product, in lieu of trying to make—keep competition well into the development of hardware that we can test and demonstrate.

Senator **Glenn**. It would seem to me that where we run into our greatest difficulty is in the areas that have the greatest state of the art advance. We really do not know quite what is going to come out of that, and sometimes there are a lot of things that go wrong, and you have to improve, and the original estimates go down the drain.

Is that the area you find most difficult in contracting, any of you?

Admiral **Sansone**. Absolutely. There may be numerous unknowns in the development phase and you are trying to predict beyond the development phase into production. You better solve the unknowns in development before you enter into production, because going into production you need to be able to price it right. Production pricing becomes very important, because that is where your quantity buys are.

General **Sharp**. I just wanted to point out that the counterpressure here is the tremendous value of getting quickly through the development process and into production. That is, reducing that time cycle from when you determine that you have a requirement until you can field a piece of gear, get that initial operational capability, shortening that time is just of extreme importance.

So you have counterpressures here, and it is a question of balancing those risks.

Senator **Glenn**. Boy, that gets expensive.

General **Sharp**. It can get awfully expensive.

Senator **Glenn**. It gets awfully expensive.

I will not give all my history here, but more years ago than I would like to remember when old Bu-Air used to be down the street where the Vietnam Memorial is now, in an old World War I depot, I was on the aircraft class desk, we called it at that time.

We were rushing a new aircraft along to get it out in the fleet. It was one of our first supersonic jets, and that was my pigeon. And I know we were trying to rush that thing through and get it out. And we had selected it on a source selection board, not through a fly-off.

But when we started flying, and not just in flight tests but actually putting it aboard ship, we had so many problems at that point that we used to joke with the manufacturer, that he should give us the airplane free and live off the money from the engineering changes.

It was not too much of a joke, either, because that is about what we are up against when you make one of these state-of-the-art leaps. And I do not know how we contract around that. I do not know that there is any way except just commonsense along the way.

Admiral **Sansone**. I think that commonsense rule does apply, because if we are not going to have a sufficient quantity to carry two contracts forward into the production cycle, then it is counterproductive.

Senator **Glenn**. If you have a flyoff, then by that time you have it well enough into the state of the art that you take a lot of the doubts away. But it is an expensive process, just running that kind of an operation.

It is like the Navy had to have a sail-off or something, between aircraft carriers. We would think that would be ridiculous and it would be.

Admiral **Sansone**. Indeed.

Senator **Glenn**. Or submerge-offs between submarines before we selected one. Sink-offs I guess it would be in that case. We would think that was ridiculous. And yet we do that on some of the other things.

I think extensive competition is fine as long as it is an item that is a common item in our society. Knives, forks, spoons and glasses, there is not any problem with things like that. You get to the state-of-the-art type things, it gets very difficult.

Let me ask a question about DCAA. They finished their estimates prior to the negotiating phase, and I believe you testified you had about 50 percent of your audit time evaluating the proposal. Does DCAA give sufficient support to the contracting office to really make the decisions, or do you have to get information from other sources too?

Admiral **Sansone**. DCAA is very helpful in giving us all the information that we require. But DCAA is not the only source of information.

We use a manufacturing and production engineering staff to give us some good advice on the technical phases and technical areas. We use our own price analysis personnel to give us additional assistance. There are a number of functional specialists that are involved in this team effort as I mentioned earlier. DCAA is a very important member of the team, but not the only member of the team.

Senator **Glenn**. Well, in your decisionmaking process would DCAA be the largest contributing factor to your decisionmaking?

Admiral **Sansone**. It is very hard to say. It is one of the large ones, I will put it that way.

Senator **Glenn**. He can put his hands over his ears while you answer. We do not want to run him out of business.

General **Weiss**. It really depends, Senator, on what stage you are in the life cycle of hardware or a weapons system. It you are in a nature production stage it is a very significant part. It you are in a full-scale engineering phase, while they can give you rates of engineers and rates, hourly rates, the multiplier, the number of hours it takes, the number of man-months, the number of man-years, the amount of test time they cannot help you on.

In that case, you are using your program office, you are using your plant rep, your contract administration services people, and specialists to give you that. So as you go into production, the more you are into production they are a great help. As you are in engineering and development, they are not as significant in terms of their cost impact.

Senator **Glenn**. Do you gentlemen in your contracting work use an error factor, an historical error factor that applies to particular manufacturers? In other words, Lockheed would have one contracting error factor that has historically been the case, and Rockwell would have another, and another and another?

I ask this because we did have that when I was in the old Bu-Air. We knew that on contract specifications that historically certain manufacturers had not met specs on the performance of the product by about a certain amount, and that was just historically true. And it varied quite widely from one manufacturer to another.

Now, I would think that in continually contracting with these people you would have error factors built in where you know you had better put in a fudge factor if it comes from a certain manufacturer, because he traditionally has understated this and you caught him at that five times before.

Do you have such an analysis?

Admiral **Sansone**. The closest thing that would match up with your experience, Senator, is the unallowables that we identify in some overhead accounts, unallowables that apply to certain G&A accounts. We set those aside and do not permit them to be billed because we know the historical error rates. We set them aside until final negotiations on the contract and adjudicate all of the costs.

I am just not familiar with error rate with respect to specifications.

Senator **Glenn**. Well, OK. I guess an alarm rate would be the case in contracting. If you know that someone has tried to fudge in taking care of their expenses, kenneling of their dogs or country clubs or whatever it is, and they have traditionally done that, you know to look more carefully at that particular manufacturer, is that right?

General **Sharp**. Yes.

Mr. **Newton**. That enters into the risk assessment that the auditor goes through in planning the audit as well. The incidence of problems of that nature would cause the auditor to expand the scope of review. More tests would be performed of the detailed accounts.

Senator **Glenn**. Do you find a wide variation from one contractor to another on how they treat those set-asides?

Admiral **Sansone**. Since the unallowable question is an important one that is being received at the current moment i.e., we are looking into the variances that exist across the system. I cannot cite a specific number at this point, sir.

Senator **Glenn**. Thank you.

Senator **Quayle**. Thank you, Senator.

Senator Levin.

Senator **Levin**. Just one more question in my quest to obtain a straightforward answer to what strikes me as a very straightforward question. Let me hypothesize this situation. We are negotiating a firm fixed price contract with a contractor. As I understand it, profit is customarily a percentage of the contractor's costs in arriving at a firm fixed price. If that custom is not accurate, correct me.

The contractor wants us to acknowledge his costs at $2 million. Our contracting officer says that $1.5 million is more accurate and more realistic and more reasonable. Would you agree that the higher the figure we agree to, the higher the profit will be for that contractor on that contract?

Admiral **Sansone**. Senator, may I try to answer that one?

Senator **Levin**. I think you already have.

Admiral **Sansone**. I was the one that took exception to the simplicity of the question. I now take exception to a firm fixed price example without knowing whether we are negotiating in a sole source environment where the contractor is the only source.

Senator **Levin**. Yes.

Admiral **Sansone**. OK, that opens up the whole area of cost data concerning his proposal and the DD-633 forms that are submitted in compliance with these are required to enable us to negotiate each and every element of cost.

In this case, yes, he is trying to support his costs in terms of what he has submitted on his cost data forms, and we are trying to negotiate downward. That is a very simple answer.

Senator **Levin**. That is fine, that is good enough. We are trying to negotiate downward and he is trying to negotiate upward.

Admiral **Sansone**. Yes, sir.

Senator **Levin**. And that is a common environment?

Admiral **Sansone**. Yes.

Senator **Levin**. Now let me take it from there. The higher the figure, ultimately the higher the profit; would you agree with that? Not the higher the percentage, but the higher the profit will be to him, since profit is customarily a percentage of the cost that we negotiage.

General **Sharp**. Not necessarily the same percentage.

Admiral **Sansone**. In terms of raw dollars if we negotiate profit as percentage of cost then the higher the costs the higher the dollar profit.

Senator **Levin**. In that environment, the sole source environment, firm fixed price environment, he comes in with costs seeking to validate them at $5 million. We say, Gee, we think $4 million is more like it. If the profit agreed to is typically 10 percent, if $5 million is the figure the profit will be $500,000, right?

Admiral **Sansone**. Yes.

Senator **Levin**. And if we agree to $4 million in costs, the profit would be $400,000, right?

Admiral **Sansone**. Yes.

Senator **Levin**. So that the higher the validated cost that he can get us to agree to, the higher his profit.

Admiral **Sansone**. On that contract, absolutely.

Senator **Levin**. Is that a common, typical scenario?

Admiral **Sansone**. I think yes. However——

Senator **Levin**. We should have quit right there.

Admiral **Sansone**. If we are dealing annually with this contractor in a sole source situation then his incurred costs become a matter of record and are audited. DCAA gives us a tremendous assist in that respect. Next year as the negotiator in that contract, I will use those incurred costs as a baseline for negotiations for the current year's requirement.

Senator **Levin**. Of course, and the higher the cost that he comes in with then the better he is going to be profitwise, no?

Admiral **Sansone**. Yes, but those actual expended costs must be reasonable.

Senator LEVIN. Of course they must be reasonable. But we went through this. A $150 hotel room is reasonable and so is a $75 hotel room.

Admiral SANSONE. Both may be unallowable.

Senator LEVIN. Unallowable?

Admiral SANSONE. Sure, depending upon the context in which you are using it.

Senator LEVIN. But there are some contexts in which it is very allowable.

Admiral SANSONE. I have issued guidance to use what the joint travel regulation says. Therefore, if the contractor comes to town and stays within the JTR per diem rate, it would be allowed and reasonable under my guidance.

Senator LEVIN. The $150 one is reasonable and so is the $75 one reasonable.

Admiral SANSONE. Yes, either could be reasonable, but the contractor will not necessarily be reimbursed accordingly.

Senator LEVIN. OK. Well, that is news to me. If hotel rooms are not legitimate business expenses, that is news to every contractor in the United States. I am telling you, that is big news to their accountants.

Admiral SANSONE. Hotel room costs in the travel account, as we pay for them in our contracts are tied to the joint travel regulations which I consider reasonable and that's Navy policy.

Senator LEVIN. I understand.

Admiral SANSONE. The rates in the joint travel regulations provide one guideline for a contracting officer to determine that which is allowable and reasonable. We do not disallow the hotel costs totally. We will allow up to the level of the joint travel regulation rate or even beyond that rate depending on what's reasonable for the area.

Senator LEVIN. And is it not true that a $150 hotel room under that regulation can be a reasonable hotel room?

Admiral SANSONE. Yes, it could be reasonable in one case, but not necessarily in another, because the JTR rates are pegged lower than that, sir.

Senator LEVIN. What is the highest rate that is allowed?

Admiral SANSONE. $75. That is the per diem rate today.

Senator LEVIN. Well, to make my point, so that we are not arguing over anything other than a principle, if you have a $50 hotel room and a $75 hotel room. There is no use quibbling over the issue. If you have a $75 hotel room, that is reasonable. A $50 hotel room is reasonable, too.

The $75 hotel room will raise your profit?

Admiral SANSONE. Yes, sir.

Senator LEVIN. Fine. That is the opposite of what we want it to be, is all I am saying. We do not want profit to go up when your costs go up, but that is the way it is in this system. And I think it is fundamental and basic and it is a problem.

And I seem to be getting a lot of resistance on it, even though it is very obvious. The solution, by the way, is not obvious. The problem is very obvious.

Admiral SANSONE. I think the solution is obvious, Senator.

Senator **Levin**. That is terrific. The problem is not, but the solution is. That is even better. What is the solution? I am sitting here breathless.

Admiral **Sansone**. I think fixed price contracting is the solution to the problem, because that pressures the contractor to only expend based on what he has bid and what the contract was signed for. Beyond that he is spending out of profit. And where he is making cost reduction efforts, he is retaining the benefits of those cost reduction efforts.

That in my view is a solution.

Senator **Levin**. Thanks. Thank you all for your patience, and for your solutions, which is more of the same.

Thanks, Mr. Chairman.

Senator **Quayle**. We have some questions for you to answer for the hearing record.

[Questions with answers supplied follow:]

Questions Submitted by Senator Dan Quayle

COST CONTROL AND COST OVERRUNS

Senator **Quayle**. In 1981, the U.S. Army's Cost Discipline Advisory Committee reported that 17 major programs were experiencing over $45 billion in cost growth. What has the Army done since then to anticipate, identify and control cost growth in Army acquisition programs through more accurate cost estimating?

Army

General **Sharp**. The Army has instituted the Program Management Control System (PMCS) under which key weapons system activities, including cost estimating, are defined and tracked. PMCS is designed to improve cost discipline through tight program management control and early problem identification. PMCS utilizes Baseline Cost Estimate (BCE), Design-to-Cost and Cost Performance Data to develop acquisition strategy. All significant cost changes are tracked against the BCE; wherever a PM determines he may not be able to execute his program within the resources identified in the BCE alternatives will be developed for containing the program, including a zero cost growth alternative reflecting a reshaping of the program to live within the existing cost baseline.

We have also completed an assessment of our Design-to-Cost (DTC) program and are taking several steps to improve it. DTC proponency offices are being established at each major subordinate command to develop and implement uniform policy and procedures for use by all development managers. There has previously been inconsistent application of award fees for incentivizing contractors to meet DTC goals and inadequate penalties for failure to meet those goals. Consequently, our development managers are encouraged to establish award fees that sufficiently motivate the contractor to meet the DTC goal and at the same time provide for penalties (e.g., tying DTC goals to production profits) if goals are not met.

Navy

Admiral **Sansone**. The Navy has continued to strengthen its independent cost analysis program as required by OSD policy. Specific steps taken have been the placing of this function under the Assistant Secretary of the Navy (Financial Management), the augmentation of staff, and the expansion of the number of estimates prepared. These independent cost estimates have played an important role in implementing DOD's "budgeting to most likely cost" initiative. Independent estimates are prepared for all programs undergoing DSARC review plus those done in the context of preparing the POM. The Navy expanded to eight the number of programs undergoing an independent estimate in connection with POM-87 submittal.

The Navy Material Command has also strengthened its cost analysis program. The Headquarters cost analysis staff now plays an aggressive role in reviewing the program manager's estimate to ensure the quality of the estimates. Naval Material Command cost analysis staffs had been strengthened through the addition of billets and their productivity has been expanded through more extensive use of ADP. Finally, new blood is now entering the Navy cost analysis field through highly motivated young analysts who are a product of the New Naval Material Command Cost Analysis Intern Program.

Also, the CNM Overhead and Wage Rate Steering Group was established in January 1983 to identify opportunities for initiatives to reduce weapons systems costs through aggressive cost reduction initiatives. Of primary concern was escalating executive compensation, salaries, wages and fringe benefit costs. The group's first significant policy was to require that any wage increase over five percent per year must be reviewed and justified at a high level. Other initiatives include subcontract review, forward pricing rate agreements, and cost monitoring.

In March 1983 the Joint Logistics Commanders (JLC) established a focal point group, the Joint Compensation Advisory Group, to review on-going wage and overhead control efforts of the Services and to identify joint initiatives to the JLC. In December 1983 the JLC endorsed the initiatives recommended by the group. The JLC-endorsed initiatives complement and support the initiatives recommended by the steering group.

Air Force

General **Weiss**. In the Air Force we developed and implemented a program to "baseline" acquisition programs. There are twenty-two major programs where the baseline is controlled at Air Force level and even more controlled by AFSC, AFLC and AFCC. By baselining these programs we establish a written agreement on the program requirements, content and funding. We've also established a formalized baseline change control system to insure that these three elements remain matched. Eleven of the twenty-two program baselines have been fully coordinated and signed. The others are in development or coordination.

In addition to baselining, every major program has an independent cost analysis conducted at major decision points and AFSC conducts, as a minimum, annual Program Financial Reviews and Cost Sufficiency Reviews to insure that the program cost estimates are accurate and reflect the current program.

Finally, cost performance is a major agenda item at each program review conducted by AFSC or by the Air Force.

CONTRACTOR PROPOSALS EARLIER IN THE ACQUISITION CYCLE

Senator **Quayle**. One problem we have had in the past is that we become locked into a single contractor during the development phase when the cost estimates of a system are still based on changing assumptions about the design, production methods, etc. The design-to-cost estimates and the should cost estimates have revealed no major cost problems. Suddenly, as we sit down to negotiate the initial production contract, the cost estimates provided by the contractor skyrocket. Since we are locked into single supplier, the negotiating leverage of the contracting officer is now very restricted.

What steps are the Services taking to demand that a contractor provide firm production cost estimates at a much earlier point in the acquisition cycle, so that we can retain the second source option?

Army

General **Sharp**. During Full Scale Development (FSD) design-to-cost goals are reduced to a framework of recurring production cost within the control of the hardware contractor. This concept is called Design To Unit Production Cost (DTUPC). The DTUPC goal is incorporated into development contracts as a cost standard, along with performance parameters, to serve as a yardstick in the production contracting process. DTUPC values are continuously monitored during engineering development and adjusted for the impact of significant engineering changes in hardware. The Army is currently making every effort to include monetary incentive award fees in engineering development contracts for motivating the contractor to achieve the DTUPC, while use of penalty clauses for failure to meet goals is strongly encouraged. Close monitoring of the DTUPC ensures that the goal is updated properly i.e., excluding changes caused by contractor inefficiencies. The DTUPC is reflected in the BCE, which then serves as a basis for determining the reasonableness of a production contractor's proposal.

A specific example of early commitment to production costs is the current competitive acquisition for the LHX. This program has been structured to provide the maximum degree of competition throughout the total program life cycle at all acquisition levels. Part of the source selection process for the development contract is an evaluation of the offeror's plans to achieve competitive sourcing for production as well as a binding commitment to a DTUPC goal as part of the FSD contract. The contractor's success in achieving that DTUPC goal will in turn be a source selection factor for production contracts.

Navy

Admiral **SANSONE**. Probably the most significant thing the Navy has done to prevent this from happening is to build into all of its major weapons systems programs an up front strategy aimed at dual sourcing, i.e. we are moving more than ever before away from sole source contracting. Complementary to this effort we are striving to fix price all production programs possible. This obviously places the cost risk on the contractor, whether it be a competitive or single source contract. If his estimates are understated then he suffers the consequences. We are also fix pricing, to the extent we can, programs that are not yet in full scale production. Recent examples of this have been the lead ship of the DDG-51 Class of ships and the F-14D aircraft program awarded in mid-1984.

Air Force

General **WEISS**. The second source option can only be retained if sufficient funding is available to continue multiple sources to a point where it is practical to obtain firm production cost estimates. The Air Force is complying with Section 8083 of the fiscal year 1985 Defense Appropriations Act which requires that no funds can be used to initiate Full Scale Engineering Development of any major defense acquisition program until the Secretary of Defense has provided to the Appropriation Committees his position on the development of two or more sources. We are pursuing second sourcing, component breakout and subcontract competition wherever the projected quantities and economic return justify their application. At the prime contract level, the Alternate Fighter Engine, AIM-7M, AIM-9M, IIR Maverick, GLCM/SLCM, Hellfire Missile and the Combined Effects Munition (CEM) programs are using dual sources for production.

SHOULD COST ANALYSIS AND MANUFACTURING TECHNOLOGY EXPERTISE

Senator **QUAYLE**. With the exception of Should Cost estimates, the various cost estimating approaches used by the Services rely heavily on historical and industry-wide trend data. As General Sharp pointed out in his testimony, the use of historical data provides the government with little basis to force a contractor to reduce inefficiencies.

How effective, in fact, has the Should Cost approach been in providing our contracting officers the leverage to force contractors to reduce their costs?

Army

General **SHARP**. The effectiveness of should cost reviews is best measured by examining results of negotiations on procurements that employed this technique. Sole source procurements over $50 million for the initial and fourth production of a system are subjected to a Level A (i.e., comprehensive, formal) should cost review, unless waived by HQ, Army Material Command. Results of negotiations are as follows:

[Dollar amounts in millions]

	Number of should cost reviews	Total proposed amount	Total negotiated	Reduction (percent)
1984	34	$6,880.9	$5,903.7	14.2
1983	50	7,398.8	6,155.8	16.8
1982	16	4,447.6	3,522.5	20.8

While the negotiation reduction for 1984 is less than in prior years, it is nevertheless considered acceptable because (1) it reflects additional costs due to warranty (2-3%) which are in most cases not reflected in the proposed costs and (2) it was realized on high-dollar follow-on contracts where should costs analyses were often performed on the previous procurements. Furthermore, should cost analyses performed on the initial procurements, in our judgment, have led to the submission of more realistic cost proposals on follow-on contracts.

Navy

Admiral **Sansone**. Very effective, but it is almost impossible to quantify that effectiveness in terms of finite cost savings related to any specific contract. Should cost studies are performed to identify uneconomical or inefficient practices in a contractor's management and operations; to quantify those findings in terms of cost impact; to use these findings to assist in developing a realistic price objective for negotiations and to lead to both short and long term improvements in a contractor's operation. These analyses include detailed technical analysis of contract requirements, drawing-based estimates of manufacturing labor, determinations of adequate levels of support labor, independent estimates or validation of material costs, and evaluations of proposed contractor labor rates and indirect costs. Results of these studies have been used as important input to the overall Navy negotiation of reasonable prices, principally on sole source contracts.

A should-cost price that is realistic and well supported by sound accounting and engineering data will provide the contracting officer with an excellent tool to use with other tools in developing a strong negotiation position (leverage).

Air Force

General **Weiss**. Should Cost techniques provide a complete element-by-element analysis of costs and, therefore, can provide better leverage for negotiation rather than the sole reliance on historical contractor performance It should be emphasized that learning curve application, use of standard times and other techniques are also used to enhance productivity where Should Costs are not used. The Air Force has changed the Should Cost policies which result in greater use of Should Cost to provide mandatory use on major programs.

MANUFACTURING TECHNOLOGY EXPERTISE

Senator **Quayle**. Have the services and DCAA attempted to increase the number of engineers with manufacturing technology expertise in their cost estimating activities?

Have you experienced problems recruiting people with degrees in industrial and production engineering?

DCAA

Mr. **Newton**. We do not employ engineers with manufacturing technology expertise specifically for cost estimating reviews, the auditor requests technical assistance from the technical specialists employed by the Defense Logistics Agency or the Services.

DCAA has had a few engineers on its staff for only 2 years. They provide assistance in our operations audits of contractor efficiency. We are gradually integrating this discipline more fully into the mainstream of audit activity. After more expertise with this staff element, we may decide to increase it.

Because of the few engineers we employ and their unique professional role, we have been able to fill the positions with highly qualified individuals. We require extensive "hand-on" experience in a manufacturing environment, preferably related to defense operations. However, due to Government pay scales and limited advancement opportunities, we anticipate and have already experienced turnover. On a recent job announcement we received nearly 100 applications, but about two-thirds of them were determined ineligible.

Army

General **Sharp**. AMC has experienced difficulty in attracting the services of qualified people with degrees in industrial and production engineering. In addition to academic credentials, the best people must have some degree of hands-on work experience in production.

AMC is now working the following initiatives to offset the effect of these limitations:

a. Established a program which results in one year manufacturing work experience with industry (as a Government engineer), Manufacturing Training with Industry.

b. Reinstituted an accredited graduate program for production engineering interns, at the Intern Training Center, for entry level production/industrial engineers.

c. Established the Advanced Manufacturing Engineering Studies program for full-time graduate study in manufacturing for intermediate level production/industrial engineers.

d. Established a senior level program with recently retired manufacturing engineering people who serve in short-term, intermittent assignments. The Service Corps of Production Executives (SCOPE) will supplement full-time production/industrial engineers.

Navy

Admiral **Sansone**. Yes. The pool of available talent in this area is obviously limited and competing with industry and others for the best in that pool will always be a problem.

The Navy has always incorporated engineers in its cost analysis staffing, but not to the degree that we want at this time. The cost analysis division within the Naval Sea Systems Command is predominantly staffed with engineers. In addition, during this past year a concentrated effort has been made to more fully incorporate engineers into the overall Naval Material Command cost analysis program. This has been done through the hiring of cost analysis interns with engineering degrees. Further, evidence of the emphasis on engineers is the Naval Material Command Headquarters' cost analysis division's addition of an engineering cost analysis branch to its staff this past year. This branch has taken the lead in developing engineering based estimates. The Navy R&D Center Resources have also been used in this area. Specifically, the Naval Avionics Center and Naval Surface Weapons Center, composed largely of engineers, have expanded their cost estimating staffs and have integrated their engineering expertise into this function to provide solid engineering based estimates.

Air Force

General **Weiss**. The Air force continues to recruit and obtain people with engineering and maufacturing skills to participate in cost estimating activities. Due to civilian grade levels this has been difficult. Recently, we have increased the number of young officers, with industrical engineering degrees, in our manufacturing operations to assist in cost estimating activities. We also continue to use experienced resources in our engineering and comptroller organizations and our AF Manufacturing Technology program office of the Materials Laboratory to assist in these complex tasks.

We do have problems in hiring degreed industrial and production/manufacturing engineers. The two most difficult areas are the upper East Coast and Los Angeles. Currently, there are ten positions that have been vacant for more than six months. The overall quality of the candidate applying for the vacant poistions has declined in recent years. We have been unable to attract highly qualified candidates in the upper echelons of these career fields. We get little response from candidates under 30 years of age. The major factor is the pay variance between government and industry positions for all grade/experience levels.

PRIVATE SECTOR VERSUS GOVERNMENT RESOURCES

Senator **Quayle**. Defense contractors obviously have a vested interest in maintaining large staffs to prepare cost estimates used in their contract proposals. How do defense industry resources generally compare with the resources available to the contracting officer for this purpose? To what extent are we forced to rely on contractors cost estimates in the preparation of our own independent cost or should cost analyses?

Army

General **Sharp**. In general, both defense contractors and Government buying activities attempt to assign the caliber and quantity of procurement personnel commensurate with the task to be accomplished. The Government has many highly trained cost analysts whose assignments reflect their experience and ability. However, unlike the Government, defense contractors are not limited by grade and personnel ceilings; they have the flexibility to go into the market place in search of the people they need and can usually augment their staff faster than the Government.

Conversely, if the Government is caught short on experienced personnel it may be necessary to reassign people, which can dilute personnel resources elsewhere.

Since the contractor is responding to the Government's request for a proposal his cost estimate may form the initial framework for discussion. This does not limit in any way the Government's review of the data submitted in support of the cost estimate, our ability to utilize additional data obtained from that particular contractor, or use of industry-wide data. Historical cost data generated under existing Government contracts may already be in hand or readily obtainable. Not surprisingly, the contractor utilzes his data in a self-serving way in developing his cost estimate. Moreover, he is generally not forthcoming with data that he has not been required to provide. It is therefore imperative that the requisite data be identified and obtained so that the contractor's cost estimate can be challenged by the Government's independent cost estimate as well as by the Government's own analysis of the contractor's data.

Navy

Admiral **Sansone**. Generally speaking the staffs of cost analysts used to support defense contractors and those in the government match up fairly well in terms of quality and professionalism. Where they do differ is primarily in management structure. Contractors tend to organize their cost analysts and other professional disciplines directly reporting to a central product or procurement manager, whereas the government usually uses a more matrix form of organization. A large defense contractor with a stable product line and business base usually will employ a large staff of cost and price analysts. These analysts may be part of a separate cost analysis division or in some cases be part of a specific engineering, manufacturing or marketing division. In either case, the cost analysts usually have specific procurement oriented tasks and are accountable to a centralized procurement manager, be it the director of a cost analyst division or the program/project director or chief engineer. The government contracting officer, on the other hand, typically relies on functional support from various advisors, including cost analysts, in a matrix organization. These advisors would include independent cost analysis groups, acquisition and budgeting activities, engineering organizations, production engineering groups, etc. The contracting officer would not have direct line authority over these individuals. This distributed management structure is necessary due to the sheer volume of government procurement actions and the economies and efficiencies that accrue from a matrix form of organizational support.

There are many more quality government resources available to a contracting officer than are available to an individual industry manager on any given procurement action. However, availability and management of these resources are much more complex and challenging for the government contracting officer, since by necessity they are available to the contracting officer when needed through a matrix management approach.

THE USEFULNESS OF DESIGN TO COST ESTIMATES

Senator **Quayle**. To what extent is the information generated in a design to cost review utilized in analyzing a contractor's proposal for an initial production contract?

Army

General **Sharp**. A viable Design-to-Cost (DTC) program includes a dedicated process for monitoring/tracking contractor performance. Contractor DTC quarterly reports are developed, submitted and assessed against firmly established performance requirements which in turn generates the ability to track performance against the production cost proposals generated by contractors. Contractor DTC quarterly reports therefore provide a direct linkage to the production negotiation process. Since the DTC goal is used as a tool for monitoring and updating the production cost estimate it is key to evaluating the contractor's proposal for initial production.

Navy

Admiral **Sansone**. Like any other tool available to the contracting officer including DCAA audit reports, technical analysis reports, should cost studies, etc. Design to Cost (DTC) information is utilized in assisting a contracting officer in evaluating a contractor's proposal. DTC activity typically is early on in the development process of a new weapon system, prior to the time when there is a suitable data base for creating firm cost estimating relationships. The DTC process converts design characteristics into cost goals and parameters through the use of cost models. The models are particularly useful in assessing cost differentials between competing or alternate designs. In terms of analyzing a contractor's proposal through use of available DTC parameters, a contracting officer could measure or assess cost growth that has occurred since earlier milestones in the program. The DTC process provides an audit trail in terms of cost objectives, parameters and targets that if exceeded cause a program review and, therefore, provide a barometer for measuring performance. Also DTC estimates are useful in conducting reviews of a contractor's plant and are beneficial in gaining insights into the contractor's overall plant operations and to develop bases upon which should cost analyses could be developed for use in negotiations.

DCAA AUDITING APPROACHES

Senator **Quayle**. Mr. Newton, as I read through your statement, I find frequent references to the use of prior experience, historical trends and the like in auditing contractors' cost estimates. What is the balance between audits which rely heavily on historical data and those which utilize the forwardlooking approach of a "should cost" study?

What is the number of industrial engineers that DCAA has available to evaluate a contractor's manufacturing methods in order to ferret out inefficiencies?

How much does DCAA depend on auditing the contractor's own evaluation of the efficiency of their manufacturing processes?

Mr. **Newton**. Because of the expense and extensive technical information requirements, we do not initiate "should cost" reviews. We do devote a portion of our total direct effort to audits of contractor operations for efficiency, economy and effectiveness as they may affect future costs. When we do participate in "should cost" reviews initiated by the acquisition organizations, these operations audits become an integral part of our participation. We also review contractor's estimating systems to determine if they produce reasonable projections including the effects of actual or planned production improvements.

We currently employ two industrial engineers to provide direct assistance in support of the two more technically complex audits. These individuals aid in audit planning, and analysis and defense of audit findings. On a broader scale, we coordinate with Government contracting organizations to obtain technical services.

To maximize the use of available resources, we review the effectiveness of the contractor management in all areas. A typical test of such effectiveness is to compare prior estimates with actual costs which have been audited for reasonableness. If the contractor has done a reasonable job in a particular area, we may not have to audit the detailed segments comprising that area. In the case of operations audits, we have a review to examine contractor initiatives toward productivity improvement. We rely on such information to the extent possible, but only as it may be appropriate.

THE COMPLIMENTARY ROLE OF AUDITORS AND CONTRACTING OFFICERS

Senator **Quayle**. When a DCAA audit report indicates that a negotiated award should be $30 million and the contracting officer negotiates a $32 million contract, does the contracting officer have the authority in each of the Services to award a contract without further notifying the DCAA auditor?

Mr. **Newton**. Restraints upon contracting officer authority to award contracts are prescribed by DoD regulations and the contracting organization, not by DCAA. However, DoD Directive Number 7640.2 (Policy for Followup on Contract Audit Reports) has an established procedure which requires, in part, ". . . When the contracting officer's proposed disposition shall be brought promptly to the attention of a designated independent senior acquisition official or board (DISAO) for review . . ." The DoD Inspector General has established review procedures to monitor contracting officer action on DCAA recommendations.

THE AH-64 PROGRAM

Senator **Quayle**. What has the Army done to make manufacturing technology expertise available to program managers for more accurate preparation of cost estimates? What steps have you taken generally to insure that sudden, substantial cost overruns do not surface when we transition the next generation of Army systems from development to production?

General **Sharp**. In June 1983, AMC implemented a regulation covering Producibility Engineering and Planning (PEP), a technical discipline that integrates production engineering into the acquisition cycle during development. PEP identifies required manufacturing technology efforts to be completed to make a weapon system producible in an efficient manner for significant quality production. Its prime purpose is to achieve a smooth transition from development to production.

A successful transition assures (through contractor reviews) that the PEP efforts are contributing to a reduction in cost. Prior to 1983, the performance of PEP was required. However, accountability was not required. It is estimated that compliance with the PEP regulation will significantly inhibit cost growths. The PEP regulation fences the funding for PEP which will insure increased compliance/performance of PEP on a timely basis. Insufficient time has elapsed to have achieved an accurate assessment of this implemented regulation.

The Production Readiness Reviews (PRRs) with their associated PEP reviews include tracking of design to cost goals (DTCG). This tracking services to assure that DTCG either remains within or has exceeded thresholds. In instances where thresholds have been exceeded remedial actions can be jointly put into effect by the program manager/contractor. One remedial action is an updated PEP plan with associated emphasis on capturing reduced DTCG. Another action would be a should cost with a supportive PRR/PEP tracking effort to identify the validity/lack of validity of cost thresholds that have been exceeded by the contractor.

Senator **Quayle**. This subcommittee is now adjourned. Thank you, gentlemen.

[Whereupon, at 4:05 p.m., the subcommittee was adjourned.]

Appendix A

THE DEPUTY SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

2 NOV 1982

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
DIRECTOR, DEFENSE LOGISTICS AGENCY

SUBJECT: Industrial Modernization Incentives Program (IMIP)

On July 8, 1982 the Tri-Service Committee developing DoD policy to encourage contractor capital investments to enhance productivity forwarded a recommendation for a new, innovative program termed the IMIP. A summary of the committee's recommendations is included in Enclosure 1.

The proposed IMIP supports DoD Acquisition Improvement Program Initiative No. 5, "Encourage Capital Investment to Enhance Productivity," and must be actively pursued. Accordingly, a test program is authorized to measure the effects of the proposed policy. Operation of the test program should be in accordance with the charter provided as Enclosure 2. The Services and DLA are authorized to make reasonable deviations from existing DAR coverage in conducting the test. Details and limitations on this authority, including requirements for appropriate Congressional liaison, are discussed in the charter.

The charter describes the Steering Group and Support Team that will be necessary during the test program. The Navy is requested to allow Rear Admiral Sansone to serve as the initial chairman in order to ensure continuity of effort. Each of the Services and the DLA are requested to nominate a senior representative and alternate to the Steering Group and provide the names to Rear Admiral Sansone in the next two weeks. Dr. Richard A. Stimson, OUSDRE(AM)IP, will be the OSD representative. Additionally, I would like the OSD staff to apprise me of the status of this initiative on a quarterly basis.

Success of the IMIP will increase defense contractor productivity and benefit both the DoD and the contractors involved. Concurrently with the test, proposed policy will be coordinated within the DoD and with industry. Specific recommendations for changes to the DAR and the proposed IMIP policy should be developed further during the next year based on experience gained during this period.

Frank C. Carlucci

Enclosures

BACKGROUND

INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM (IMIP)

The Tri-Service Committee for Improving Industrial Productivity was formed in March 1982 to consolidate the Military Departments' views on DoD policy for the Service programs known as "Technology Modernization" (Tech Mod) and "Industrial Productivity Improvement." The Committee was commissioned by the USDRE and chaired by Rear Admiral Sansone, Deputy Chief of Naval Material for Contracts and Business Management. The Tri-Service Committee developed a draft unified DoD policy and procedures in the form of a DoD Instruction which defines the contracting strategy and the financial resources necessary to implement the program. The principal thrust of the proposed DoD Instruction 5000.XX, termed the "Industrial Modernization Incentives Program (IMIP)," is as follows:

o A joint government and industry venture is necessary to improve the defense industrial base and create a win/win environment.

o The approach is an expansion of the philosophy of the Services "Technology Modernization" and "Industrial Productivity Improvement" Programs aimed at more widespread use.

o The policy targets industry through contractual incentives to increase substantially capital investments primarily with its own financing in manufacturing technology, engineering applications (and improved manufacturing processes), and modern plant and equipment for enhanced production efficiency and productivity for defense work.

o The primary incentives include productivity shared savings rewards which permit industry to share in the savings (cost reductions) on programs which result from productivity enhancing capital investments, and contractor investment protection (through a contingent liability guarantee) to allow for amortization of plant and equipment.

o Investments include all assets and real property. Current policy only allows investments in severable assets with a unit value greater than $10,000.

o Application is for weapon systems, equipment, and material--it is not limited to only major weapon systems.

o Special emphasis is on improving the productivity of subcontractors and vendors, not only prime contractors. Subcontractors and vendors will be reached through the primes or directly through separate agreements.

o The policy allows maximum flexibility so that each DoD Component can implement the policy based on its organizational structure, and based on the size, scope, and complexity of the project(s) concerned.

Enclosure 1

o When more than one DoD Component is doing business with an IMIP contractor, one DoD Component will be assigned the lead and will consolidate other DoD Component requirements.

The IMIP has had preliminary coordination with the Services and DLA (0-8 level and below), and informally with industry (NSIA/CODSIA working group and others). Positive comments have been received from all concerned.

The Tri-Service Committee also prepared three draft contract clauses to support IMIP implementation, as follows:

- Capital Investment Incentive - Government Acquisition of Assets.
- Capital Investment Incentive - Shared Savings (Percentage Share Approach).
- Capital Investment Incentive - Shared Savings (Return on Investment Approach).

The Committee recommended that the above clauses, which reflect the sharing of benefits and allocation of risks, be incorporated in an IMIP upon approval and acceptance of a proposed project, instead of the clause described in Defense Acquisition Regulation (DAR) 3-815 (while still recommending that the requirements of DAR 3-815(d)(2)(ii) to notify Congress and DAR 3-815(g) to obtain high level approval of contingent liabilities be followed). Recognizing that these clauses would not apply to all IMIPs, the Committee recommended that a test program for the proposed capital investment incentives be conducted to measure the effects of the proposed incentives, variations, and others which could be developed and potentially utilized.

CHARTER
TEST OF THE
INDUSTRIAL MODERNIZATION INCENTIVES PROGRAM (IMIP)

Background

DAR 3-815 presently describes a procedure for the government to accept certain risks of program failure (termination or severe reduction) in order to encourage contractor investment in severable plant equipment to reduce DoD acquisition costs. Other sections of the DAR also provide for the recognition of costs and the negotiation of profit in a fashion intended to encourage contractor investment in facilities necessary for the efficient production of defense equipment. An identified disincentive to contractor investment, however, is the policy and practice of pricing contracts on the basis of costs expected to be incurred--any significant reduction in costs of performance will cause a related reduction in negotiated profits. Thus a mechanism must be found to permit contractors to benefit from their cost reduction efforts. In addition, the present application of DAR 3-815 to only severable plant equipment further diminishes DoD's ability to encourage contractor investment in necessary capital assets.

Objective

While recognizing that DAR coverage requires changes, the DoD is not yet in a position to propose the exact nature of the changes required. The test is being initiated with the objective being to develop and submit specific recommendations for changes to the DAR and improvements to IMIP policy. At the completion of the test program, a formal DoD IMIP instruction will be issued.

Documentation

The draft DoD Instruction 5000.XX, "Industrial Modernization Incentives Program," draft clauses developed by the Tri-Service Committee and the draft DoD Guide "Improving Productivity in Defense Contracting" are key documents to be evaluated during the test. This documentation will be separately circulated and made available to appropriate government and industry personnel. The documents are dynamic and may be modified as necessary during conduct of the test program. In addition, new clauses may be developed based on the circumstances of the acquisitions concerned.

Test Program Structure

A. Steering Group

A Steering Group will be formed to monitor the conduct and results of the test program (considering lessons learned on Services' Technology Modernization and Industrial Productivity Improvement Programs now in progress), and provide appropriate recommendations to the DoD Components (the Services and DLA). They should define the time and scope of the test effort, have visibility over DoD Component-developed plans for the program, assist in preparing the Memorandum of Understanding for

IMIPs where more than one DoD Component is involved, and address issues such as funding and monitoring contingent liabilities as they occur. They shall have oversight responsibility for DAR deviations during the test program (see Authority paragraph below), and will ensure appropriate Congressional notification and liaison occurs. The Steering Group should evaluate the success of the various incentives and overall program. They should provide recommendations for DAR changes and IMIP policy improvements based on comments received and experience gained during the test period.

B. Support Team

To ensure IMIP implementation and to support the Steering Group, each DoD Component should establish (and provide requisite funding support for) an IMIP Support Team. The team should be composed of top-flight, experienced personnel in contracts, manufacturing, productivity, finance-budget, and legal matters to provide assistance to program and acquisition managers and to industry. The IMIP Support Team should assist in conducting seminars and training. They should draft, review, and implement DoD Component IMIP instructions for contracting, technical, and financial matters; provide the focal point for coordination with other DoD Components for joint IMIPs; act as a repository for data collection including reporting of IMIP progress and results; and provide other support, as required.

C. Decentralization

The test program will be decentralized allowing each of the DoD Components to pursue incentives which they feel will best encourage productivity enhancing, contractor capital investments. It must be recognized, however, that a convergence of techniques and procedures will be required in the ultimate formulation of an overall DoD approach and policy. Accordingly, the DoD Components should work closely with each other and with the Steering Group to share information and ideas throughout the conduct of the test program.

Authority

For the conduct of this test program, the DoD Components are authorized a blanket waiver to DAR 1-108 and 1-109 which outline the usual procedures for obtaining DAR deviations. Instead, the controls established in this charter are to be used to prototype specific capital investment incentive changes, consistent with current legislative requirements, and to field test changes agreed upon. In this regard, Head of Contracting Activity (HCA) approval should be obtained when specific deviations are required. The HCA will keep the Steering Group apprised of all deviations granted. Steering Group approval will be required for all deviations which affect more than one contract. Requests for deviations will be submitted in DAR case format. Deputy Under Secretary of Defense (Acquisition Management) approval will be required on requests for deviations which involve major policy issues in areas other than capital investment incentives (i.e., patent policy). The OSD representative on the Steering Group will keep the Deputy Under Secretary of Defense (Acquisition Management) apprised of all deviation activity. Copies of all deviations granted will be provided to the DAR Council. The fiscal authority who commits funds to any resultant contract must comply, however, with DAR 3-815(d)(2)(ii) in assuring high-level approval of contingent liabilities is obtained and in notifying Congress in advance of the use of this technique, when applicable. In addition, notification to the Assistant Secretary of Defense (Comptroller) and the Under Secretary of Defense (Research and Engineering) will be required prior to contract signatures, on any contract which establishes a liability of ten million dollars or more, which is contingent upon future production.

Limitations

Incentives and procedures employed during this test must be consistent with current legislative requirements.

Capital investment incentives which provide contractor investment (termination) protection through a contingent liability guarantee for real property may be used on a limited basis. The incentive shall be structured so as to provide a disposal procedure such that government need not take title to real property in the event of contract termination or cancellation. Liaison with key congressional subcommittees will be required. Proposed rules on contingent liabilities and boundaries for the test should be established prior to the liaison.

Clauses tested must be consistent with Cost Accounting Standards.

Test Conditions

Under the test, contractors will have the opportunity to share in the government's savings through the use of sharing arrangements on a percentage basis, through a return on investment (ROI) approach, or through other appropriate approaches. In addition, the government's assumption of risk for program failure would not be limited to severable plant equipment and could include investments made for non-severable assets, provided appropriate approvals are received.

Programs selected by the DoD Components to participate in the test will be based on a number of factors including high potential for substantial savings and other factors as described in proposed DoD Instruction 5000.XX. Test conditions will be under the purview of the Steering Group.

Contractor proposals should be encouraged based on established criteria, such as (1) the investment will not be made but for the government's agreement to share benefits and accept certain risks; (2) there is a reasonable expectation that adoption of the proposal will result in a substantial savings to the government through lower unit production cost or that other benefits as stated in proposed DoD Instruction 5000.XX will result; (3) there is a reasonable expectation that funds will be available to procure the projected quantities; (4) the investment should primarily support enhanced production efficiency of an existing or anticipated operation, not new production capacity; and (5) the investment will have desirable benefits in other areas such as industrial preparedness.

Contractor proposals should contain an identification of assets to be acquired by the contractor; identification of items they will be used to produce; a description of the difference between the contractor's production methods with and without the proposed investment; detailed cost estimates for the existing contract requirements and the proposal (including a realistic assessment of the effects on direct and indirect costs, implementation costs, etc.); an analysis of effects of learning, variations of quantities, changes to make-or-buy plans, subcontracting, labor contract agreements, and other similar factors; and a suggested business arrangement describing government and contractor benefit sharing over existing and future contracts and the time frame for acceptance of the proposal.

Issues to be Considered

The following are examples of issues to be considered during the conduct of the test program. Maximum use will be made of existing experience in Technology Modernization and Industrial Productivity Improvement Programs. The issues are subject to revision and refinement by the Steering Group.

- Development of different incentives appropriate for various contractual situations; i.e., contract size (large and small contracts), contract types (fixed price vs. cost), and degree of competition.

- Ways to ensure incentive provisions can be successfully employed to encourage investments by subcontractors and vendors.

- Application of incentives to other than single contracts, such as when numerous DoD Component contracts and different DoD Component contracting activities deal with a single contractor.

- The manner in which incentive clauses can be applied to non-severable assets and real property.

- Verifiable evaluation criteria for measuring contract performance including validating cost savings and other benefits.

- Assessment on how the use of these incentives affects competition. (Does DoD provide an undue competitive advantage to selected contractors? Can competitive solicitations be structured to permit alternative proposals based on use of these incentives?)

- Determination if unit production prices to DoD in acquisition programs will measurably decrease through the use of these incentives.
- Evaluation of whether contractor investment in capital assets (facilities, equipment, and associated data or computer software) needed for the defense industrial base increase through the use of these incentives.
- Determination of how the increased production efficiency aspects of proposals can be separated from possible increased production capa[illegible] for proper evaluation.
- Assessment of the unintended or unforeseen effects of the utilization of these provisions.
- Relationship between the Weighted Guidelines (DAR 3-808.2) and the new incentives. What changes and adjustments, if any, will be necessary to the Weighted Guidelines?
- Combination of contractor investment protection and shared saving type incentives, and their interaction with other incentives such as Value Engineering and Design-to-Cost.
- Identification of incentives to improve productivity in areas other than through capital investment (e.g., human resources, overhead, inventory, and product design).
- Candid evaluation of the success of various incentives and the overall program.

PROGRAM REPORT, 31 MARCH 1985

Industrial Modernization Incentives Program (IMIP)

BACKGROUND:

The Deputy Secretary of Defense authorized a test of the Industrial Modernization Incentives Program (IMIP) on November 2, 1982. The objective of the test is to more fully develop concepts underlying earlier Service efforts such as the Air Force Technology Modernization Program. The test is intended to allow the DoD Components to gain practical experience in developing, testing, and refining contract incentives encouraging increased capital investments and modernization by defense industry. Results of the test are to be used in the formulation and issuance of DoD policy and guidelines related to the application of these incentives. The IMIP implements Defense Acquisition Improvement Program Initiative No. 5, "Encourage Capital Investment to Enhance Productivity".

The premise behind the IMIP is that significant opportunities exist to modernize manufacturing processes in the defense acquisition environment. Although there are many good examples of advance manufacturing technology applications, a significant portion of manufacturing done on defense programs is done in an environment that can be characterized as utilizing outdated and inefficient capital equipment and as being labor-intensive. Batch production methods are used extensively in manufacturing for the DoD. Quantities are small and deliveries are over a period of time. Engineering changes frequently occur. It should be noted that as a result of these factors, recent technology advances which point to major manufacturing improvements are particularly suited to DoD needs. Flexible manufacturing systems appear to offer the greatest promise. These computer-controlled and integrated machines, work stations, transfer mechanisms, and tooling allow production of a wide variety of products in small numbers.

In Defense two problems have been cited most frequently as inhibiting modernization and progress in the productivity area. These are program uncertainties and a profit policy which, in certain acquisition circumstances, is based on cost. In the first instance, risks are introduced which hinder investment amortization and inhibit long-term planning. In the case of our cost-based profit policy, a contractor may actually see future profits reduced as a result of efforts to improve productivity and reduce costs. In our zeal to negotiate the lowest possible contract price, we at times negotiate the lowest-term benefits a contractor may see from modernization, leaving only the risks.

The IMIP is a response to these challenges. It is a targeted and controlled way of fostering increased capital investment and modernization. It relies on incentives such as shared savings rewards, contractor investment protection, and award fees to encourage contractors to invest their own funds in modern plant and equipment. The DoD must see the prospect of reduced acquisition cost as a result of any business arrangements negotiated under IMIP. Associated benefits may result in areas such as quality, reliability or the industrial base and should be highlighted in proposals.

STATUS AND ACCOMPLISHMENTS:

Discussions, factory studies, framework agreement negotiations, and project implementation are underway with a significant number of contractors. General Dynamics, Fort Worth (F-16), and Westinghouse, Baltimore (multi-program), have received the most publicity in terms of concept applications. An even greater number of contractors are involved when subcontractor and vendors are considered. Individual DoD Component activity and plans for the future are summarized later in this report. When all programs are fully implemented, the IMIP will have generated contractor-funded investments of over $1.5 billion resulting in defense weapons systems cost savings of over $5 billion.

Although the number of contractors involved is impressive, it should be stressed that much of the activity is at an early stage. An intensive systems engineering analysis of the manufacturing facility is normally the first step of an IMIP. It defines the improvements possible and the benefits to be derived. It may be followed by further engineering development related to specific technology applications. While this activity is occurring, it is generally desirable to negotiate a framework business arrangement that establishes guidelines on the type and structure of incentives to be considered, the investments to which they may be applied, the expected benefits to both parties, the various baselines that must be established, and tracking and verification requirements. It is only after all this has occurred that actual negotiation of specific capital investment plans under IMIP can proceed. The process can be stopped at any point if benefits to both the DoD and the contractor cannot be demonstrated.

There has been a great deal of activity under IMIP up to the point of actual implementation of individual contractor capital investment plans. After this phase, with some notable exceptions, experience is more limited. This can be seen from the DOD component summaries. However, the IMIP process is an iterative one that builds on earlier efforts. Broad implementation and maximum benefits at a particular facility are likely to span a number of years.

A great deal has been learned during the IMIP test to date. The most important lesson is that the process does work. Increased capital investment and enhanced productivity can be stimulated through efforts such as IMIP. IMIP is a viable acquisition tool that can be used when situations warrant. But it is neither the only tool nor is it applicable in all situations. Some of the judgments involved are subjective, and different approaches are possible. This can lead to differing opinions at times--but the alternative is to do nothing. Flexibility must be retained to tailor the concepts to the particular application. Knowledge and good judgment are essential--not rigid adherence to specific procedures.

Many of the issues addressed by the Deputy Secretary of Defense charter for the IMIP test are addressed in the following sections along with plans for completing the test. In summary, IMIP has served well as a focal point for increased contractor capital investment and productivity. It demonstrates DoD interest in the area and is a catalyst and stimulant for increased contractor activity. It provides the impetus for action and a mechanism to reinforce aggressive contractor productivity improvement programs.

o Publicity and Training. Visibility of the IMIP remains high since the test authorization. The DoD Components have conducted a number of workshops and training sessions for field and program personnel. Several IMIP information packages have been distributed to contractor personnel through the industry associations. In addition, IMIP has been the subject of Government and industry panel discussions (including ones sponsored by the National Security Industrial Association, the Federal Acquisition Research Symposium, and the National Contract Management Association) and several articles (such as those appearing in Defense Management Journal, Industrial Engineering, Government Executive, and National Defense, magazines).

o Steering Group Meetings. IMIP Steering Group meetings have been held on approximately a quarterly basis. Rear Admiral Joseph S. Sansone, Jr., Deputy Chief of Naval Material, chairs a flag-level group DoD Component executives. The Defense Contract Audit Agency participates as a member of the Steering Group. NASA recently expressed an interest in joining the Steering Group and its Director of Productivity has begun attending meetings. The focus of the meetings has centered on DoD component organization and planning for the test, incentive structures, ROI analysis, validation and tracking of requirements, and mechanisms to simplify administration.

o ROI Model. An important tool for use in evaluating specific return-on-investment (ROI) aspects of an IMIP is a model utilizing discounted cash flow techniques that has been developed for use in conjunction with IMIP negotiations. It provides a common framework for evaluating and understanding the effects of an investment decision in the DoD contracting environment. It has been widely distributed and feedback has been very positive.

The ROI model is basically a spread sheet financial analysis program available for use on an IBM personal computer or through the DoD's time sharing system. Inputs include cash flows projected over a number of years including the level and timing of a contractor's capital expenditures. Positive components to a contractor include reimbursements for Cost Accounting Standard (CAS) 414 interest, CAS 409 depreciation, and shared savings rewards as a result of IMIP. One of the offset factors is lost profit as a result of productivity savings. The results of the cost flows to the Government, including productivity savings, are factored into the model. This allows calculation of the contractor internal rate of return and the Government's benefit.

The model has proven to be of tremendous utility in evaluating capital investment components of an IMIP. Indeed, the model may indicate the desirability of making an ivestment apart from any special shared savings rewards or other IMIP incentives. But it is less relevant when evaluating productivity improvement efforts associated with an IMIP (such as management systems or human resource programs) that have a minimal capital equipment cost. In addition, other factors such as risk (to contractor and Government), magnitude of savings, confidence in an ability to set baselines, and quality, reliability, and industrial base impact must also be considered in determining appropriate shared savings rewards.

These factors have resulted in a conscious effort on the part of Government and industry not to over-focus on specific ROIs. The analysis is not a deterministic one--and there can be considerable discussion in arriving at the proper data to input into the model. But it is nevertheless a valuable tool to assist in evaluating IMIP proposals and may suggest a range of appropriate rewards.

o Incentive Structures. Shared savings rewards are receiving the greatest use in IMIP applications. Contractor investment protection is used less frequently and, in most cases, Government exposure has been relatively insignificant. One difficulty encountered in using shared savings rewards has been the connotations of a 50/50 share which are engendered based on experience with Value Engineering approaches. When such sharing is used on IMIP, it is usually only used up to a ceiling--which in reality equates to an overall lower contractor share or an ROI approach. There is little Government sentiment towards using an arbitrary share on the order of magnitude of 50/50 unless very exacting audit and verification requirements are imposed, analysis of risks and benefits demonstrate that it is appropriate, and precise baselines can be established. Award fees have been used infrequently, but they may offer great potential when there are significant subjective features present in an IMIP. The Army, based on Under Secretary of the Army interest, has been encouraged to explore the possiblity of allowing additional profit to reward IMIP efforts as opposed to below the line incentive approaches; however, in the final analysis both methods should yield similar results.

Incentive structures which utilize before-the-fact analysis of need versus after-the-fact auditing of results are being stressed because the latter is particularly difficult with any degree of precision in an altered factor situation. However, validation and tracking of savings and demonstration of cost reductions are being carefully addressed early in each program in order to retain program credibility and process discipline, and to allow judgmental decisions as to the course of future actions. Reasonableness of requirements in this area is a key to the program's success. The need for DCAA and Contract Administration involvement early in the IMIP formulation cycle is stressed.

o Documentation. Strawman versions of FAR/DoD FAR Supplement coverage for IMIP and revisions to the draft DoD IMIP Guide and DoD Directive were distributed to Industry and Government for comment in November 1984. DoD FAR Supplement IMIP coverage can be expected to replace the current Section 15.872 procedures to permit broader IMIP concepts. Using received comments as a basis, all three documents will then be more intensively reviewed as a package (and revised as necessary) during a joint Industry/Government Workshop in May 1985 prior to initiation of the formal policy coordination process. This documentation, together with an evaluation and report of the results of the IMIP test, should support test phase termination and broader IMIP policy implementation. This effort should occur in Fall 1985.

o Sharing Factor. A contractual mechanism known as the IMIP sharing factor was recently approved by the IMIP Steering Group and instructions issued to the field which will allow testing of this concept. The sharing factor allocates the productivity savings rewards over all benefiting contracts at a manufacturing facility and fosters factory-wide IMIP applications. Sharing factor clauses are to be included in contracts but will become operational only upon execution of a master agreement establishing all of the terms and conditions of its use. This constitutes the only FAR/DAR deviation taken in accordance with provision of the IMIP test charter.

o Congressional Interface. In general, Congress has been supportive of the program. Some concern was expressed in the FY 84 appropriations process based on what we feel to be a misunderstanding of the term "IMIP business arrangement" and a perception that the program was moving too fast. In fact, the program is proceeding cautiously. One of the problems of conveying this in a decentralized program like IMIP centers around difficulties in developing necessary data bases. IMIP working group personnel are currently addressing this issue. We continue to work with the staffs to keep them informed of the program status.

o Funding. Interim policy guidance and procedures as to the sources of funding for IMIP was provided in a joint USDRE and ASC memorandum dated 17 June 1983. Contractor funds are to be used for actual capital investments. Contractor funds, program or weapon system funds, and P.E. 78011 (Industrial Preparedness) funds are to be used in the order of preference as listed for IMIP factory analysis and applications engineering efforts. The Services have taken different approaches to date in their emphasis on the use of these funds as dictated by circumstances and experience. The Air Force, for instance, has used programmed Technology Modernization funds (synonymous with IMIP funding) in the applications area to foster implementation of demonstrated technologies which require considerable engineering and software development (and present some technical risk) at specific multi-weapon system production facilities. Availability of funds, in any case, is limited and must be preserved for the highest payoff opportunities.

o Subcontractor/Vendor Involvement. A very high priority goal of the IMIP test is to find ways to impact the subcontractor and vendor base. This generally occurs through flowdown from the prime contractor, and most IMIP agreements contain this provision. General Dynamics (F-16) has the most aggressive and advanced program of this type. The initial use of a direct Government IMIP with a subcontractor was by the Air Force with the Cleveland Pneumatic Company. There is also an interest in developing industry-wide programs, as evidenced by early efforts on Traveling Wave Tubes. This is thought to be an area where separate Government funding will have the greatest leverage.

o Other Issues. It is desired under IMIP to only incentivize investments over and above what a contractor must make to meet normal contractual obligations. Examination of a contractor's capital investment profile (actual for previous years and planned for future years) appears to offer a workable solution to concerns that may arise. It is also evident that IMIP and broader productivity improvement plans must be integral parts of our acquisition strategy. Multiyear procurement can have a synergistic impact with and, at times, mitigate the need for an IMIP. Second sourcing plans and competition strategies must also be considered. The issue of undue competitive advantage to a contractor with an IMIP, as identified in the IMIP test charter, has not been raised as a detrimental factor to date.

DoD COMPONENT IMIP SUMMARIES:

The following sections summarize IMIP activity by the Military Services and DLA. Degree of program maturity is generally designated as follows: Phase I (factory analysis or study), Phase II (applications engineering), and Phase III (contractor capital investment and implementation). Projections are best estimates and some variation from actual results can be expected.

Air Force

Air Force's IMIP evolved from the exisiting Technology Modernization effort under way since 1978. This program is one of the key elements of the Air Force Industrial Base Program (IBP). Through the IBP the Air Force has begun to address the deteriorating state of the Defense Industrial Base and give recognition to its importance as a deterrent to war. The evolution of the IBP has been in response to current Defense Guidance with reinstituted objectives in the areas of industrial base peacetime productivity, surge capability, industrial sustainability, and planning.

Recognizing the synergistic effects of needed peacetime initiatives and wartime readiness, the Air force revamped its Industrial Base Planning. To address the dual problem of low productivity growth and limited capacity, an aggressive Production Base Analysis (PBA) is now being maintained to guide investment decisions within the Air Force IBP. Not only are major industry sectors being analyzed but specific production limitations are also being identified. The Aeronautical Systems Division's contribution to the FY 84 PBA, "Blue Print for Tomorrow," centered on the aerospace industry. During FY 85, the Air Force will build on the FY 84 PBA and expand its scope to cover the electronics sector.

With a solid planning process in place, the Air Force is emphasizing the major contributors of productivity growth--technology and capitalization. The Air Force Manufacturing Technology Program, another key element of the IBP, provides impetus to getting new higher technical risk processes and techniques. on the factory floor for the manufacture of Air Force systems and equipment.

The final and most important element of the IBP is the Air Force's IMIP which integrates the business and technical approach to improve contractor productivity and responsiveness through capital investment and integration of manufacturing technology. The Air Force IMIPs address the contractor's factory as a total system, identifying and solving the discrete impediments to higher productivity. As the pioneer in concepts to encourage contractor investment, the Air Force uses productivity savings rewards and contractor investment protection, where appropriate, to incentivize contractors to make productivity enhancing capital investments.

The Air Force program has grown to the point of involving over 80 DoD contractors at both the prime and subtier levels. The two major buying Commands, Air Force Systems Command (AFSC) and Air Force Logistics Command (AFLC), are executing the Air Force program. These programs cut across the following eight industry sectors: Aircraft, Propulsion, Electronics, Tactical Missiles, Strategic Missiles, Space Systems, Munitions, and the Subtier Production Base.

The Air Force has programs in all phases as indicated below. All product divisions within AFSC have initiated IMIPs and two AFLC Air Logistics Centers (ALCs) have initiated IMIPs which are in Phase I. Projected contractor investments and estimated savings continue to be updated as the programs evolve and matures.

Contractor investment through 1992 is currently estimated at $1.3B based on a Government investment of $300M with a resultant savings of over $4B to the DoD.

During the past year the Air Force has established central IMIP offices at some AFSC product divisions. These offices will focus on programs which involve several systems, are directed at the subtier, or are centered on a specific industry sector such as the TWT industry. The Air Force has emphasized IMIP training by holding workshops with DCAA, DLA, and within the Air Force itself.

General Dynamics (F-16). First Air Force IMIP/Tech Mod initiated in 1978. GOCO Plant. Implementation phase. To date: contractor capital investment of $132.9M, Government investment of $57M, cumulative shared savings incentive of $9M and award fees of $6M. Contractor investment protection (maximum Government exposure of $112M and approximately $20M now remaining) was provided in conjunction with the contractor capital investment. Validated savings of $185.9M through FY 85 (present multi-year). Additional projected savings of $319.1M through FY 91 (1748 aircraft). FY 85 plans: additional contractor capital investment of $17.3M, expand program to white collar productivity area.

Industrial Tech Mod (ITM). The F-16 subcontractor/vendor program is the first and most complex effort of its type in the DoD. It has the goal of revitalizing the DoD industrial base and focuses on factory-wide modernization benefiting not only the F-16 but also other major programs. Nineteen participants currently in the program. Plans are to include a total of 60 vendors. Two have submitted Phase II sharing proposals. Others have signed framework business arrangements and are in various phases. Aggregate totals to date: projected participant capital investment of $267M, Government investment, $33M, projected savings of $557M (19 vendors only). FY 85 plans: additional 17 participants, (6 new Phase I, 11 new Phase II), first sharing factor applications.

Westinghouse. Initial Air Force multi-program IMIP concept application. Phase III in progress on initial capital investment plan including Electronics Assembly Plant (EAP) and implementation of Standard Electronic Assembly Station (SEAS), Robot-Enabled Assembly of Cables and Harnesses (REACH), and Material Accountability-Robotic Knitting (MARK). To date: contractor capital investment of $55M, Government investment of $7M, projected savings of $190M through 1992, and payment of shared savings incentive of $1.5M in FY 84. FY 85 plans: additional Phase II projects.

Pratt and Whitney. Phase I and II projects are currently under way at the Georgia Disk Facility and initial contractor capital investment (Phase III activity) is imminent. Three subcontractors (RMI, Universal Cyclops, and Precision Castparts) have also completed Phase I and are currently in Phase II negotiations. Projections: contractor capital investment of $365M through FY 86 ($25M in FY 84 and $100M in FY 85), Government investment of $45M through FY 86 ($21M through FY 84 and $11M in FY 85), and Government savings of $650M occurring FY 86-90. Additional FY 85 plans: possible payment of first shared savings incentives and initiation of subcontractor Phase II activity.

General Electric. The prime thrust of this program is to modernize all nine Aircraft Engine Business Group (AEBG) plants and key second and third-tier suppliers. As of July 1984, efforts were under way at four AEBG plants and three suppliers (PCC, Ladish, and TRW). The total projected Government investment through FY 86 is $53M with a projected contractor capital investment of $302M of which $112M is anticipated in FY 84. Projected savings through FY 90 is $600M. FY 85 plans: initiate programs at the remaining AEBG plants and expand the vendor program, additional contractor capital investment of $120M, and possible payment of first shared savings incentives.

Traveling Wave Tubes (TWTs). First Air Force initiative to reach a small industry sector which serves the U.S. Government almost exclusively. Current projections indicate that demand for TWTs will double during the late 1980s. These projections, along with past delays in fielding EW equipment, have created concerns regarding the industry's ability to meet defense requirements in a timely, cost-effective manner. TWTs are characterized as high cost items having labor-intensive manufacturing operations with poor yields and low mean time between failure. TWTs were identified in the Air Force's Production Base Analysis as critical long lead time items. During FY 84 two TWT manufacturers (Teledyne and Varian) will complete their company-funded Phase I factory analysis and submit Phase II proposals. Teledyne's Phase II proposals are being evaluated and Varian's Phase I is in process. Raytheon proposals are also anticipated. Detail design, development and demonstration of enabling technology projects will be jointly funded. Government Phase II investment is $5.5M and projected contractor Phase II/III capital investment is $17M. Projected savings are $100M over eight years.

Additional Predominantly Phase II Activity. Under way with the following companies: General Electric (Syracuse) (some Phase III activity), Singer-Kearfott, Rockwell-Collins, Hazeltine, Hughes Aircraft Missile Systems Group, Texas Instruments (efforts with subcontractors only), Rockwell International, Boeing Military Airplane Company, Raytheon Missile Systems Division, Georgia Lockheed (some Phase III activity), Martin-Marietta Orlando Aerospace, Williams International, and Sonicraft.

Additional Phase I or Early Discussion Activity. Under way with the following companies: Honeywell Space and Strategic Avionics Division, Rockwell Autonetics Strategic Systems Division, Raytheon Equipment Division, Lockheed Missiles and Space, Hughes Aircraft Electronics Dynamics Division, General Electric (SSD), Magnavox (Torrance, CA), Fairchild Republic, AVCO Aerostructures, Cleveland Pneumatic, Magnavox (Fort Wayne, IN), General Electric (Valley Forge, PA), Fafnir Bearing, ABA Industries, and GTE.

Navy

Since initiation of the IMIP test, the Navy has worked to establish a core of personnel at the headquarters and field levels in support of IMIP efforts. This was a conceptually new approach for the Navy and they have had some notable successes in IMIP applications. These are summarized below. Contractor-funded investments through 1992 are estimated at $260M with a resultant cost savings of over $1B. Other efforts at an earlier state include: (1) Allison Gas Turbine (Navy has been designated as the tri-service lead and a "ballpark" estimate of potential investments is $300M), and (2) McDonnell Douglas Astronautics Company. In addition, the Navy has entered into discussions with major shipyards (including Newport News Shipbuilding, Ingalls, and Bath Iron Works) concerning possible IMIP applications. Potential savings are enormous. As with the other DoD Components, the Navy is working to integrate IMIP into the Industrial Base Planning process.

Grumman Aerospace. A Memorandum of Agreement was signed on 9 November 1983 providing for potential contractor investment of $78M to $90M over the life of the program of which $16M investment is expected in non-capital areas. Contractor investment through the end of FY 85 is expected to total $55M. The Navy has agreed to spend $16M in associated manufacturing technology projects. Shared savings incentives are to be used. Projected annual savings, if the modernizatrion plan is fully implemented, are $50M per year. Five Navy programs benefit from this effort (F-14, A-6, C-2, E-2, and EA-6B). FY 85 plans include an additional contractor investment of $20M and the exploration of a subcontractor program.

General Dynamics/Morton Thiokol. Morton Thiokol, as a subcontractor to General Dynamics Pomona, entered into a three-party agreement on 8 September 1983 to modernize production of the Standard Missile MR MK-104 DTRM. Morton Thiokol is fully funding all phases of the IMIP. Contractor capital investment of $6M is expected through FY 85. Projected savings over the life of the program exceed $150M. Shared savings incentives are to be used. FY 85 plans: additional contractor capital investment of $1M and an extention of the program to other subcontractors on the rocket motor.

Hughes Aircraft Radar Systems. A Memorandum of Agreement was signed on 24 April 1984 with Hughes as a subcontractor to McDonnell Aircraft for the F/A-18. Contractor capital investment of $4M is expected through FY 85 and is forecasted to total $30M by FY 89. Projected savings over the life of the program are $100M. Shared savings incentives are to be used. FY 85 plans: additional contractor capital investment of $5M.

Northrop Aircraft. A Memorandum of Agreement was signed on 24 April 1984 with Northrop as a subcontractor to McDonnell Aircraft for the F/A-18. Contractor capital investment of $3M is anticipated through FY 85 and is forecasted to total $20M by FY 89. Projected savings over the life of the program is $250M. Shared savings incentives are to be used. FY 85 plans: additional contractor capital investment of between $3M to $9M.

Hughes Ground Systems Group. A Memorandum of Understanding covering Hughes' Phase I study was signed in January 1985. The Navy has been designated as the tri-service lead for this IMIP agreement. A plantwide modernization is planned, covering over 20 Navy, Army and Air Force programs, and focusing on overhead costs. Contractor investment of $60M is projected with potential cost savings of $50M a year when all modernization projects are implemented.

Intercontinental Manufacturing Company (IMCO). A Memorandum of Understanding covering IMCO's Phase I study was signed in January 1985. The Phase I Structured Analysis cost, completely funded by IMCO, is estimated to be $215,000. Contractor capital investment of $4M is forecasted with potential cost savings of $20M. Benefiting programs are the MK-12 and MK-70 Boosters for the SM-1 and SM-2 versions of the Standard Missile.

National Forge Company. A Memorandum of Understanding covering National Forge's Phase I study was signed in January 1985. The Phase I Structured Analysis cost, completely funded by National Forge, is estimated to be $165,000. Contractor capital investment of $6.4M is projected with potential savings of $16.5M. Benefiting programs include Ship Propulsion Shafts and Components for the CG-47, SSN-688, SSBN, LSD-41, and DDG-51 ship classes.

General Dynamics Pomona. A Memorandum of Understanding covering G.D. Pomona's Phase I study was signed in January 1985. The Phase I Structured Analysis cost, completely funded by the contractor, is estimated to be $2.6M. Contractor capital investment and potential savings are to be determined. The initial benefiting program will be the Standard Missile. However, an eventual total factory modernization is anticipated.

B.F. Goodrich. A Memorandum of Understanding covering B.F. Goodrich's Phase I study was signed in January 1985. The Phase I Structured Analysis cost, completely funded by Goodrich, is estimated to be $200,000. Contractor capital investment of $12M is projected with potential savings to be determined. Benefiting programs include Sonar Rubber Domes and Windows.

Lockheed California. Lockheed California has initiated a Phase I Structured Analysis of its facility. Its cost, completely funded by the contractor, is estimated to be $550,000. Contractor capital investment and potential savings are to be determined. Benefiting programs include the P-3 and S-3 ASW aircraft.

General Electric (Evandale). A Memorandum of Understanding covering General Electric's Phase I study was signed in early March 1985. The Navy has been designated as the tri-service IMIP lead for this agreement. The Phase I Structured Analysis cost, completely funded by General Electric is estimated to be $560,000. Contractor capital investment of $22.3M is projected with potential savings of $275M. Benefiting programs include Rocket Chambers for the Standard Missile MK-104, HARM Missile, and the Patriot Missile.

Inco Selective Services, Inc. (NOVAMET). A Memorandum of Understanding covering NOVAMET's Phase I study was signed in March 1985. The Phase I Structured Analysis cost, completely funded by NOVAMET, is estimated to be $600,000. Contractor capital investment of $11M is projected with potential savings of $100M. Benefiting programs include the MK-50 Torpedo and Hull Materials.

Army

The Army is reevaluating current IMIP endeavors and is cautiously formulating a business arrangement proposal strategy that is consistent with concerns expressed in recent months by the Under Secretary of the Army. Specific points the Under Secretary wants to address are: (1) relate profit (incentive) to assets employed; (2) pay an incremental added profit rate (incentive) for cost savings related to added investments; (3) reduce Government provided investment; and (4) foster increased overhead allowances for productivity related effort. An understanding and approval of the framework for future IMIP applications will be obtained with the Army staff prior to initiation of new efforts. The Army will continue to participate in and support multi-Service negotiations for IMIPs.

AVCO-Lycoming (M-1 tank engine, T53/55 helicopter engines). Army investment totals $10M to date through Phase II which has been completed.

General Dynamics Land Systems (M-1 tank). Army investment to date is $4.1M for Phase I which has been completed. The Army is awaiting the contractor's Phase II/III proposal which was requested in February 1985.

Bell Helicopter (AHIP), Hughes Helicopter (AH-64 APACHE), and Harris Corporation (Modular Integrated Communication and Navigation System - MICNS). Have all substantially completed Phase I work. The Army is awaiting the contractors' Phase II/III proposals which were requested in February 1985.

Defense Logistics Agency

Several commodities have been reviewed for application of an IMIP either under DLA leadership or in concert with the Military Services. IMIP planning continues on the Meals, Ready-to-Eat procurement. Following award of the next year's procurement, initial discussions with the winner(s) will begin. IMIP efforts concerning military tentage are being to be held in abeyance pending the conclusion of Natick Laboratory's test and evaluation of the new. polyester material on the Tent, Modular Personnel (TEMPER) tent. As estimated conclusion date for this testing is not available. Efforts for the next year will focus on the clothing and textile industrial sector in light of DLA's procurements in this area and the problems presently being encountered due to international trade considerations. In addition, work will continue on those projects already under way as described below.

Amertex Enterprises Ltd. IMIP efforts affecting the Kevlar Fragmentation Vest and uniform shirts have resulted in the initiation of a Phase I study. This represents the first IMIP effort directly under DLA control. The contractor will deliver the completed study in late September, 1984 for validation. Incentives negotiations on possible shared arrangements will follow that effort.

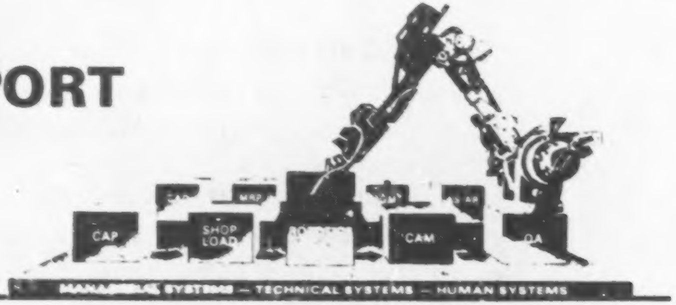
Chemical Protective Suit. An industry letter has been recently released to the prospective bidders for the FY 85 procurement. The letter states that the winner(s) of this procurement will be invited to participate in a Phase I study. Its intent will be to ascertain the viability of an IMIP under the design constraints of the suit today. Predicated upon the findings of this study, follow-on action will be developed at a later date.

THE DOD
INDUSTRIAL
MODERNIZATION
INCENTIVES PROGRAM

IMIP PRODUCTIVITY COST

STATUS REPORT

January 1985


CAP
SHOP LOAD
MRP
CAM
QA
MANAGERIAL SYSTEMS — TECHNICAL SYSTEMS — HUMAN SYSTEMS

RADM J.S. SANSONE, JR. SC, USN
DEPUTY CHIEF OF NAVAL MATERIAL
(CONTRACTS AND BUSINESS MANAGEMENT)

N0501-GA-85-121 472

IMIP

- MOTIVATES PRIME DOD CONTRACTORS, SUBCONTRACTORS AND VENDORS TO:
  - SUBSTANTIALLY INCREASE PRODUCTIVITY ENHANCING CAPITAL INVESTMENTS IN:
    - MODERNIZATION OF EQUIPMENT AND FACILITIES, INCLUDING REAL PROPERTY
    - DEVELOPMENT AND INSTALLATION OF ADVANCED MANUFACTURING TECHNOLOGY
  - MAKE COST REDUCING IMPROVEMENTS IN ALL ASPECTS OF OPERATIONS:
    - MATERIAL, SUBCONTRACTS, OVERHEAD, SUPPORT FUNCTIONS AND SYSTEMS
    - SOFTWARE, ENGINEERING, MANAGEMENT AND ORGANIZATION CHANGES
- PRIMARY CONTRACTUAL INCENTIVES ARE:
  - SHARED SAVINGS REWARDS
    - RETURN ON INVESTMENT (ROI)
    - PERCENTAGE SHARE OF SAVINGS
    - ROI PLUS PERCENTAGE SHARE OF SAVINGS
  - CONTRACTOR INVESTMENT PROTECTION, WHEN APPROPRIATE
- OTHER BENEFITS INCLUDE:
  - INCREASED QUALITY AND RELIABILITY; INCREASED SURGE AND MOBILIZATION
- 100% CONTRACTOR FINANCING PREFERRED; PERFORMED IN THREE PHASES - STUDY; DEMONSTRATION/VALIDATION; IMPLEMENTATION

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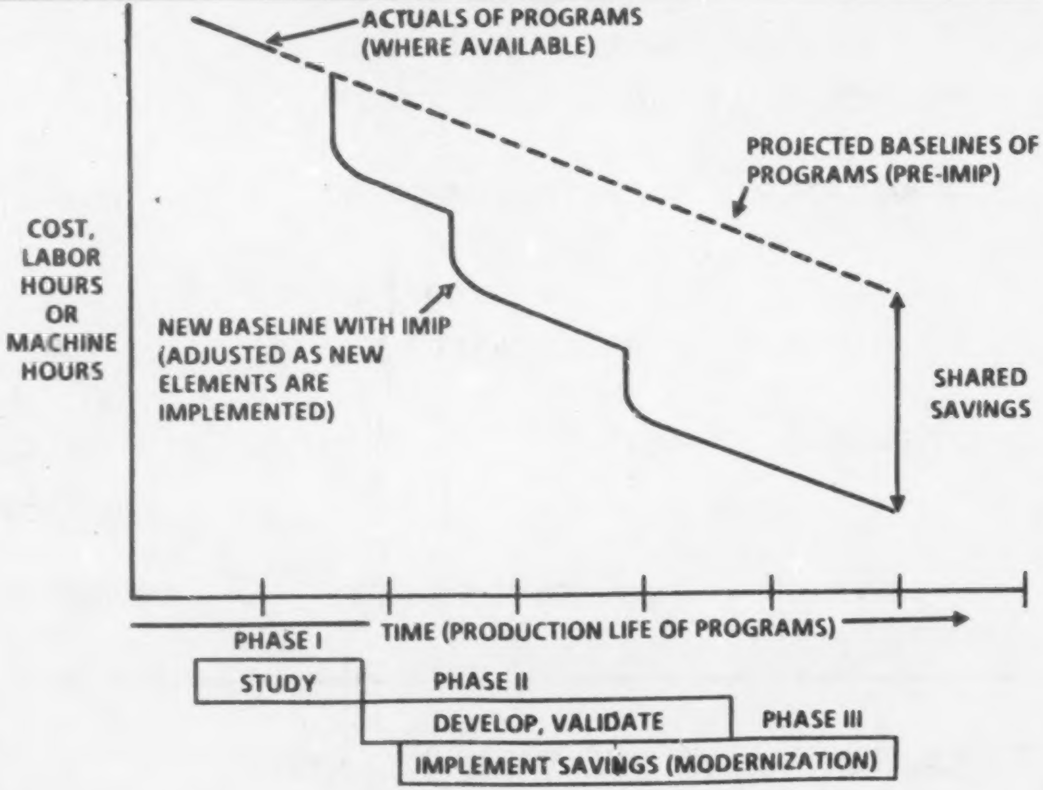
IMIP AND BASELINE ADJUSTMENTS TO PROGRAMS



IMIP STEERING GROUP

CHAIRMAN	RADM J. S. SANSONE, JR.	NAVMAT
MEMBERS		
OSD	DR. RICHARD A. STIMSON	OUSDRE (AM) IP
ARMY	MGEN DAVID W. STALLINGS	AMC
	MR. FRED MICHEL	AMC
AIR FORCE	BGEN BERNARD L. WEISS	HQ, USAF (ROC)
DLA	MGEN JOSEPH H. CONNOLLY	DD CAS
	MR. RAYMOND F. CHIESA	DLA-P
DCAA	MR. FRED NEWTON	DCAA

BENEFITS OF IMIP TEST

- DOD COMPONENT COOPERATION
- FLEXIBILITY - NEW IDEAS
  - CHANGING MIND SETS
  - CENTRALIZED IMIP NEGOTIATIONS
  - BETTER BUSINESS DEALS/IMPROVED ANALYSIS
  - WILL IMPACT FUTURE DOD PROFIT POLICY
- INCREASED CONTRACTOR CAPITAL INVESTMENT
  - SHARED SAVING AS MOTIVATOR

DOD IMIP RESULTS TO DATE

PROJECTED NEW CONTRACTOR PRODUCTIVITY ENHANCING CAPITAL INVESTMENTS	PROJECTED SAVINGS TO BE SHARED
$1.5 BILLION	$5 BILLION

- IMIP BUSINESS DEALS CONSIDER ALL DOD COST PRINCIPLES, PROFIT POLICY, TAX POLICY AND THE TIME VALUE OF MONEY
- IMIP BUSINESS DEALS REWARD PRODUCTIVITY ENHANCING ASSET MANAGEMENT

CURRENT IMIP INITIATIVES

- IMIP DOCUMENTATION
  - DOD DIRECTIVE
  - DOD GUIDE
  - DFAR LANGUAGE

- END OF IMIP TEST

SELECTED NAVY PROGRAMS

IMIP PRODUCTIVITY COST

STATUS	COMPANY	SYSTEMS	PROJECTED BENEFITS* (IN $ MILLIONS)
CURRENT PROGRAMS:	GRUMMAN	FACTORY MOD FOR F-14, A-6, C-2, E-2, EA-6B	$300+
	NORTHROP	F/A-18A CENTER/AFT FUSELAGE	$250
	HUGHES (RADAR SYSTEMS)	RADARS: APG-65 (F-18), AWG-9 (F-14), APG-63 (F-15) (AIR FORCE PARTICIPATION)	$100
	THIOKOL/GENERAL DYNAMICS	FACTORY MOD FOR DUAL THRUST ROCKET MOTOR, MK-104, FOR SM-2	$95-$206
	HUGHES (GSG)	TOTAL FACTORY MOD (ADCAP, UYQ-21, MEWS, JTIDS, OTHERS (NAVY LEAD)**	$200
	NATIONAL FORGE	SHIP PROPULSION SHAFT COMPONENTS FOR CG-47, SSN-688, SSBN, LSD-41, DDG-51	$17
	GD POMONA	TOTAL FACTORY MOD (NAVY LEAD)**	TBD
	B.F. GOODRICH	SONAR RUBBER DOMES	TBD
	IMCO	MK-12 BOOSTER (SM-1 MISSILE), MK-70 (SM-2 MISSILE)	$20

*PROJECTED BENEFITS ARE BEST ESTIMATES

**TRI-SERVICE

***AIR FORCE/NAVY

SELECTED NAVY PROGRAMS (CONT'D)

STATUS	COMPANY	SYSTEMS	PROJECTED BENEFITS* (IN $ MILLIONS)
UNDER DISCUSSION:	FMC	MK-45 MOUNT, MK-13 MISSILE LAUNCHING SYSTEM	TBD
	GENERAL ELECTRIC	ROCKET MOTOR CASINGS (SM-2, HARM, PATRIOT) (NAVY LEAD)**	$275
	BATH IRON WORKS	TOTAL FACTORY MOD	TBD
	ALLISON (GENERAL MOTORS)	TOTAL FACTORY MOD (VARIOUS AIRCRAFT ENGINES) (NAVY LEAD)**	$200-$300
	McDONNELL	HARPOON	TBD
	OTHERS		

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*PROJECTED BENEFITS ARE BEST ESTIMATES

**TRI-SERVICE

***AIR FORCE/NAVY

CURRENT AIR FORCE PROGRAMS

IMIP

COMMAND	COMPANY	SYSTEMS	PHASE	CONTR/AF INVESTMENT($M)	PROJECTED SAVINGS*($M)
ASD	GENERAL DYNAMICS	F-16	III	164/ 59	503
	GD I.T.M.	F-16 SUBCONTRACTORS	III	250/ 55	557
	ROCKWELL/AIL	B-1B	II	95/ 29	250
	BOEING MILITARY	KC-135, B-1B, B-52	II	54/ 15	600
	GELAC	C-5, B-1B	III	5/ 6	7
	FAIRCHILD	T-46 TRAINER	II	6/ 9	50
	MARTIN-MARIETTA	LANTIRN	II	58/ 7	75
	GENERAL ELECTRIC	ENGINES: F-101/103/108/110/ 404, T700, TF34, TF-39	II	302/ 53	600
	PRATT & WHITNEY	ENGINES: F-100, TF33, TF30 PW3037	II	245/ 24	650
	WILLIAMS INT'L	CRUISE MISSILE ENGINE	II	36/ 30	160
	AVCO	C-5, B-1B	I	125/ 4	TBD
	CLEVELAND PNEUMATIC	VARIOUS LANDING GEARS	II	20/ 5	TBD
	VARIAN	TWT	I	18/ 6	94
AD	HUGHES MSG	AMRAAM	II	44/ 23	273
	RAYTHEON	AMRAAM	I	13/ 10	63
	TEXAS INSTRUMENTS	GUIDANCE SYSTEMS	I	35/ 9	TBD
	HUGHES MSG(PLANT 44)	MAVERICK, TOW, PHOENIX**	II	TBD/ 11	TBD

* ESTIMATED ** TRI-SERVICE

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CURRENT AIR FORCE PROGRAMS (CONT'D.)

IMIP

COMMAND	COMPANY	SYSTEMS	PHASE	CONTR AF INVESTMENT($M)	PROJECTED SAVINGS*($M)
ESD	WESTINGHOUSE	A/C ELECTRONICS, ASPJ, ALQ-131	III	55/ 6	190
	GENERAL ELECTRIC	RADAR SYSTEMS	III	10/ 3	TBD
	ROCKWELL-COLLINS	JTIDS	II	6/ 5	139
	SINGER-KEARFOTT	JTIDS	II	9/ 4	28
	HAZELTINE	SEEK TALK, AN/APX-76 IFF	II	4/ 4	25
	RAYTHEON	MILSTAR	II	TBD/ 1	TBD
	SONICRAFT	MEECN (616A), DIVERSITY RECEPTION EQUIPMENT	I	1/ 4	10
BMO	HONEYWELL	PEACEKEEPER	II	6/ 6	16
	AUTONETICS	PEACEKEEPER	II	8/ 5	16
SD	LOCKHEED	SPACE PRODUCTION	I	TBD/TBD	TBD
	HUGHES (EDD)	TWTA (SPACE)	I	TBD/ 2	TBD
	GENERAL ELECTRIC	COMMUNICATIONS	I	6/ 3	4
	MAGNAVOX	GPS	I	TBD/ 3	28

* ESTIMATED